## MASS DIFFERENCES OF K<sub>L</sub> AND K<sub>S</sub> MESONS

## E. O. OKONOV

## Joint Institute for Nuclear Research, Dubna

Oscillations of $K^0$ , registration of $K_{e3}$ decays <sup>1</sup> : "Heavy" bubble chamber0.47 $\pm$ 0.212315Oscillations of $\overline{K}^0$ , registration of hyperons <sup>3</sup> : 1. Propane bubble chamber0.88 $\pm$ 0.224772. 25 - inch hydrogen bubble chamber0.50 $\pm$ 0.155773. 80 - inch hydrogen bubble chamber0.54 $\pm$ $\frac{0.09}{0.14}$ 954. 30 - inch deuterium bubble chamber0.72 $\pm$ 0.18784Oscillations in the $K^0 \rightarrow \pi^* \pi^-$ decay of scattered kaons <sup>8</sup> : 30 - inch deuterium bubble chamber0.72 $\pm$ 0.187841. 30 - inch deuterium bubble chamber, Fe regenerator0.84 $\pm$ $\frac{0.29}{0.22}$ 1642. Magnetic spectrometer with spark chambers, Cu regenerator0.84 $\pm$ $\frac{0.29}{0.22}$ 1642. Magnetic spectrometer with spark chambers, Cu regenerator0.72 $\pm$ 0.15 <sup>15</sup> 0.53 $\pm$ 0.103. Magnetic spectrometer with spark chambers, Cu regenerator0.72 $\pm$ 0.15 <sup>15</sup> 0.53 $\pm$ 0.103. Magnetic spectrometer with spark chambers, Cu regenerator0.53 $\pm$ 0.100.53 $\pm$ 0.111. Magnetic spectrometer with spark chambers, Cu regenerator (2.5 and 5 cm)0.50 $\pm$ 0.10 <sup>19</sup> 0.50 $\pm$ 0.10 <sup>19</sup> 2. Spark chambers without magnetic field, regenerator of $K_S^0$ from target with regenerated $K_S^0$ <sup>21</sup> ; Spark chambers in magnetic field10.22 min (2.13 $\pm$ 0.024 <sup>24</sup> 1. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu)0.445 $\pm$ 0.034 <sup>24</sup> 2. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu)0.445 $\pm$ 0.034 <sup>24</sup> 3. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu)0.445 $\pm$ 0.034 <sup>24</sup> <	Methods and Conditions of Experiment	$\frac{m_L - m_S \text{ in units}}{\text{ of } \hbar/\tau_S \cdot c^2}$	Statistics (number of cases)
Oscillations of $\mathbb{K}^0$ , registration of $\mathbb{K}_{e3}$ decays $^1$ : "Heavy" bubble chamber0.47 $\pm$ 0.212315Oscillations of $\mathbb{K}^0$ , registration of hyperons $^3$ : 1. Propane bubble chamber0.88 $\pm$ 0.2243152. 25 - inch hydrogen bubble chamber0.50 $\pm$ 0.155773. 80 - inch deuterium bubble chamber0.54 $\pm$ 0.09e 0.14e954. 30 - inch deuterium bubble chamber0.72 $\pm$ 0.18784Oscillations in the $\mathbb{K}^0 \to \pi^* \pi^-$ decay of scattered kaons $^8$ : 30 - inch deuterium bubble chamber9.72 $\pm$ 0.18784Oscillations of coherently- and diffraction-regenerated $\mathbb{K}_5^0$ 10°.1.30 - inch propane bubble chamber, Fe regenerator0.84 $\pm$ 0.2911 0.2211642. Magnetic spectrometer with spark chambers, Cu regenerator0.76 $\pm$ 0.2014 0.2211642. Spark chambers without magnetic field, Fe regenerator0.76 $\pm$ 0.2014 			
"Heavy" bubble chamber $0.47 \pm 0.21^2$ $315$ Oscillations of $\overline{K}^0$ , registration of hyperons 3: $0.47 \pm 0.21^2$ $315$ 1. Propane bubble chamber $0.50 \pm 0.15^5$ $77$ 2. 25 - inch hydrogen bubble chamber $0.50 \pm 0.15^5$ $77$ 3. 80 - inch hydrogen bubble chamber $0.54 \pm 0.09^6$ $95$ 4. 30 - inch deuterium bubble chamber $0.54 \pm 0.09^6$ $95$ 30 - inch deuterium bubble chamber $0.72 \pm 0.18^7$ $84$ Oscillations in the $K^0 \rightarrow \pi^* \pi^-$ aceay of scattered kaons $^8$ : $0.72 \pm 0.18^7$ $84$ 30 - inch deuterium bubble chamber, Fe regenerator $0.84 \pm 0.29^{11}$ $164$ 1. 30 - inch propane bubble chamber, Fe regenerator $0.84 \pm 0.22^{11}$ $164$ 2. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14}$ $0.22 \pm 0.15^{15}$ 3. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14}$ $0.53 \pm 0.15^{20}$ 1. Magnetic spectrometer with spark chambers, Cu regenerator $0.50 \pm 0.10^{19}$ $-0.11$ 1. Magnetic spectrometer with spark chambers, Cu regenerator $0.50 \pm 0.10^{19}$ $-0.11$ 1. Magnetic spectrometer with spark chambers, Cu regenerator (2.5 and 5 cm) $0.50 \pm 0.10^{19}$ $+0.35 \pm 0.15^{20}$ 2. Spark chambers without magnetic field, regenerators of C (10.2 cm) and $+0.44 \pm 0.06^{22}$ $+0.44 \pm 0.06^{22}$ Interference of $K_0^0 + \pi^* \pi^* and K_0^0 \to \pi^* \pi^*^{-23}:+0.44 \pm 0.06^{22}+0.44 \pm 0.06^{22}Interference of K_0^0 + \pi^* \pi^* and K_0^0 \to \pi^* \pi^{-23}:+0.44 \pm 0.044 \pm 0.024^{24}-0.445 \pm 0.034^{2$	Oscillations of K <sup>0</sup> , registration of Ke <sub>3</sub> decays <sup>1</sup> :		
Oscillations of $K^0$ , registration of hyperons 3:0.88 ± 0.2241. Propane bubble chamber0.50 ± 0.155772. 25 - inch hydrogen bubble chamber0.50 ± 0.155773. 80 - inch hydrogen bubble chamber0.54 ± $\frac{0.09}{0.14}$ 954. 30 - inch deuterium bubble chamber0.72 ± 0.18784Oscillations in the $K^0 \to \pi^*\pi^-$ decay of scattered kaons 5:0.72 ± 0.1678430 - inch deuterium bubble chamber0.88 ± 0.291164Altio of coherently- and diffraction-regenerated $K_5^{0.10}$ :1640.2211. 30 - inch propane bubble chamber, Fe regenerator0.84 ± $\frac{0.29}{0.22}$ 1642. Magnetic spectrometer with spark chambers, Cu regenerator0.41 + $0.25_{12}$ 1642. Spark chambers without magnetic field, Fe regenerator0.76 ± 0.20^{14}0.53 + $0.10$ 3. Magnetic spectrometer with spark chambers, Cu regenerators0.53 + $0.10$ $-0.11$ Interference of $K_5^0$ coherently regenerated in two regenerators 17, 180.50 ± $0.10^{19}$ $+ 0.35 \pm 0.15^{30}$ 1. Magnetic spectrometer with spark chambers, Cu regenerator (2.5 and 5 cm) $0.50 \pm 0.10^{19}$ $+ 0.35 \pm 0.15^{30}$ 2. Spark chambers without magnetic field, regenerators of C (10.2 cm) and U (6.25 cm) $+ 0.44 \pm 0.06^{22}$ $+ 0.44 \pm 0.06^{22}$ Interference of $K_5^0 + \pi^*\pi^-$ and $K_5^0 + \pi^*\pi^{-3}$ : $+ 0.44 \pm 0.06^{22}$ $+ 0.44 \pm 0.06^{22}$ Interference of $K_5^0 + \pi^*\pi^-$ and $K_5^0 + \pi^*\pi^{-3}$ : $+ 0.44 \pm 0.06^{22}$ $+ 0.44 \pm 0.06^{22}$ Interference of $K_5^0 + \pi^*\pi^-$ and $K_5^0 + \pi^*\pi^{-3}$ : $+ 0.44 \pm 0.06^{22}$ $+ 0.44 $	"Heavy" bubble chamber	$0.47 \pm 0.21^2$	315
1. Propane bubble chamber $0.88 \pm 0.22^{4}$ 2. 25 - inch hydrogen bubble chamber $0.50 \pm 0.15^{5}$ 773. 80 - inch hydrogen bubble chamber $0.50 \pm 0.15^{5}$ 954. 30 - inch deuterium bubble chamber $0.72 \pm 0.18^{7}$ 84Oscillations in the $K^{0} \rightarrow \pi^{+}\pi^{-}$ decay of scattered kaons <sup>5</sup> : $0.72 \pm 0.18^{7}$ 8430 - inch deuterium bubble chamber $0.72 \pm 0.18^{7}$ 84Nagetic of coherently- and diffraction-regenerated $K_{S}^{0}$ 10: $10.56 \pm 0.16^{9}$ 721. 30 - inch propane bubble chamber, Fe regenerator $0.84 \pm \frac{0.29}{0.22}$ 1642. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14}$ 1642. Spark chambers without magnetic field, Fe regenerator $0.76 \pm 0.20^{14}$ 1643. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14}$ 1643. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14}$ 1643. Magnetic spectrometer with spark chambers, Cu regenerator $0.50 \pm 0.15^{15}$ 1653. Magnetic spectrometer with spark chambers, Cu regenerators $0.50 \pm 0.10^{19}$ 163 ± 0.10 - 0.11Interference of $K_{S}^{0}$ coherently regenerated K_{S}^{0} 21: $0.50 \pm 0.15^{20}$ 164Spark chambers in magnetic field, regenerated $K_{S}^{0}$ 21: $0.44 \pm 0.06^{22}$ 164 ± 0.06^{22}Interference of $K_{S}^{0} + \pi^{+}\pi^{-}$ and $K_{S}^{0} + \pi^{+}\pi^{-33}$ : $0.44 \pm 0.06^{22}$ 164 ± 0.024^{25}I. Magnetic spectrometer with spark chambers, $K_{S}^{0}$ from regenerator (Cu) $0.445 \pm 0.034^{24}$ 0.408 \pm 0.02	Oscillations of $\overline{K}^0$ , registration of hyperons <sup>3</sup> :		
2. 25 - inch hydrogen bubble chamber $0.50 \pm 0.15^{25}$ 773. 80 - inch hydrogen bubble chamber $0.50 \pm 0.14^{5}$ 954. 30 - inch deuterium bubble chamber $0.72 \pm 0.18^{7}$ 84Oscillations in the $K^{0} \rightarrow \pi^{+}\pi^{-}$ decay of scattered kaons $^{5}$ : $0.72 \pm 0.18^{7}$ 84Oscillations in the $K^{0} \rightarrow \pi^{+}\pi^{-}$ decay of scattered kaons $^{5}$ : $0.72 \pm 0.18^{7}$ 84Oscillations in the $K^{0} \rightarrow \pi^{+}\pi^{-}$ decay of scattered kaons $^{5}$ : $0.72 \pm 0.18^{7}$ 84Oscillations in the K <sup>0</sup> $\rightarrow \pi^{+}\pi^{-}$ decay of scattered kaons $^{5}$ : $0.72 \pm 0.18^{7}$ 84Oscillations in the K <sup>0</sup> $\rightarrow \pi^{+}\pi^{-}$ decay of scattered kaons $^{5}$ : $0.72 \pm 0.18^{7}$ 84Oscillations in the K <sup>0</sup> $\rightarrow \pi^{+}\pi^{-}$ decay of scattered kaons $^{5}$ : $0.84 \pm 0.29_{11}$ 1641. 30 - inch propane bubble chamber, Fe regenerator $0.84 \pm 0.29_{11}$ 1642. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14}$ $0.72 \pm 0.15^{15}$ 3. Magnetic spectrometer with spark chambers, Cu and Al regenerators $0.75 \pm 0.15^{15}$ $0.53 \pm 0.10^{-1}$ 3. Magnetic spectrometer with spark chambers, Cu regenerator (2.5 and 5 cm) $0.50 \pm 0.10^{19}$ $0.50 \pm 0.15^{20}$ 4. Magnetic spectrometer with spark chambers, $K_{0}^{5}$ from regenerator (Cu) $0.445 \pm 0.034^{24}$ $0.444 \pm 0.06^{22}$ 1. Magnetic spectrometer with spark chambers, $K_{0}^{5}$ from regenerator (Cu) $0.445 \pm 0.034^{24}$ $0.406 \pm 0.024^{25}$	1. Propane bubble chamber	$0.88 \pm 0.22^4$	
3. 80- inch hydrogen bubble chamber $0.54 \pm \frac{0.09}{0.14}$ 954. 30- inch deuterium bubble chamber $0.54 \pm \frac{0.09}{0.14}$ 950.scillations in the K <sup>0</sup> $\rightarrow \pi^*\pi^-$ decay of scattered kaons *: $0.72 \pm 0.18^7$ 840.scillations in the K <sup>0</sup> $\rightarrow \pi^*\pi^-$ decay of scattered kaons *: $0.56 \pm 0.16^9$ 7230- inch deuterium bubble chamber $+ 0.56 \pm 0.16^9$ 72Ratio of coherently- and diffraction-regenerator K <sup>0</sup> <sub>S</sub> <sup>10</sup> : $- 0.50 \pm 0.16^9$ 721. 30- inch propane bubble chamber, Fe regenerator $0.84 \pm \frac{0.29}{0.22}$ 1642. Magnetic spectrometer with spark chambers, Cu regenerator $0.72 \pm 0.15^{12} - 0.20$ 1642. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14}$ $0.22 \pm 0.15^{15}$ 3. Magnetic spectrometer with spark chambers, Cu and Al regenerators $0.72 \pm 0.15^{15}$ $0.53 \pm 0.10^{19} \pm 0.25 \pm 0.15^{10}$ 1. Magnetic spectrometer with spark chambers, Cu aregenerator (2.5 and 5 cm) $0.50 \pm 0.10^{19} \pm 0.35 \pm 0.15^{20}$ $0.50 \pm 0.10^{19} \pm 0.35 \pm 0.15^{20}$ 2. Spark chambers in magnetic field, regenerators of C (10.2 cm) and U (6.25 cm) $0.44 \pm 0.06^{22} \pm 0.034^{24} \pm 0.44 \pm 0.06^{22}$ 1. Magnetic spectrometer with spark chambers, K <sup>0</sup> <sub>S</sub> from regenerator (Cu) $0.445 \pm 0.034^{24} \pm 0.482 \pm 0.034^{24} \pm 0.482 \pm 0.034^{24} \pm 0.482 \pm 0.024^{25}$	2. 25 - inch hydrogen bubble chamber	$0.50 \pm 0.15^{\circ}$	77
4. 30- inch deuterium bubble chamber $0.72 \pm 0.18^7$ 84Oscillations in the $K^0 \to \pi^+\pi^-$ decay of scattered kaons ${}^8$ : 30- inch deuterium bubble chamber Ratio of coherently- and diffraction-regenerated $K_S^{0-10}$ : 1. 30- inch propane bubble chamber, Fe regenerator $0.72 \pm 0.18^7$ 842. Magnetic spectrometer with spark chambers, Cu regenerator Coherent regeneration as function of regenerator thickness ${}^{13}$ : 1. Magnetic spectrometer with spark chambers, Cu regenerator 2. Spark chambers without magnetic field, Fe regenerator 3. Magnetic spectrometer with spark chambers, Cu and Al regenerators 2. Spark chambers without magnetic field, regenerators of C (10.2 cm) and U (6.25 cm) $0.50 \pm 0.10^{19}$ $+ 0.35 \pm 0.15^{30}$ 1641. Magnetic spectrometer with spark chambers, Cu regenerator of $K_S^0$ from target with regenerated $K_S^{0-21}$ : Spark chambers in magnetic field Interference of $K_S^0 \to \pi^+\pi^-$ and $K_S^0 \to \pi^+\pi^{-23}$ : 1. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) 2. Spark chambers in magnetic field Interference of $K_S^0 \to \pi^+\pi^-$ and $K_S^0 \to \pi^+\pi^{-23}$ : 1. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) 2. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) 2. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) 2. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) 2. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) 3. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) 3. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) 3. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) 3. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) 3. Magnetic spectrometer with	3. 80- inch hydrogen bubble chamber	$0.54 \pm \frac{0.09}{0.14}^{6}$	95
Oscillations in the $K^0 \to \pi^* \pi^-$ decay of scattered kaons *: 30-inch deuterium bubble chamber Ratio of coherently- and diffraction-regenerated $K_S^{0}^{10}$ :+ 0.56 ± 0.16 <sup>9</sup> 721. 30- inch propane bubble chamber, Fe regenerator $0.84 \pm \frac{0.29}{0.22}$ 1642. Magnetic spectrometer with spark chambers, Cu regenerator $0.41 \pm 0.25_{12} - 0.20$ 1642. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14}$ 0.213. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14}$ 0.53 \pm 0.103. Magnetic spectrometer with spark chambers, Cu and Al regenerators $0.53 \pm 0.10$ $-0.11$ 1. Magnetic spectrometer with spark chambers, Cu regenerator $0.50 \pm 0.10^{19}$ $+0.35 \pm 0.15^{30}$ 2. Spark chambers without magnetic field, Fe regenerator (2.5 and 5 cm) $0.50 \pm 0.10^{19}$ $+0.35 \pm 0.15^{30}$ 2. Spark chambers in magnetic field, regenerated $K_S^{0-21}$ : $+0.44 \pm 0.06^{22}$ $+0.44 \pm 0.06^{22}$ 1. Magnetic spectrometer with spark chambers, $K_S^{0}$ from regenerator (Cu) $0.445 \pm 0.034^{24}$ $0.480 \pm 0.024^{25}$	4. 30-inch deuterium bubble chamber	$0.72 \pm 0.18^7$	84
30- inch deuterium bubble chamber Ratio of coherently- and diffraction-regenerated $K_S^{0}$ 10:+ 0.56 $\pm$ 0.169721. 30- inch propane bubble chamber, Fe regenerator0.84 $\pm$ 0.2911 0.211642. Magnetic spectrometer with spark chambers, Cu regenerator0.41 $\pm$ 0.2512 - 0.201642. Magnetic spectrometer with spark chambers, Cu regenerator0.76 $\pm$ 0.20141642. Spark chambers without magnetic field, Fe regenerator0.76 $\pm$ 0.20140.72 $\pm$ 0.15153. Magnetic spectrometer with spark chambers, Cu and Al regenerators0.53 $\pm$ 0.10 - 0.110.53 $\pm$ 0.10 - 0.111. Magnetic spectrometer with spark chambers, Cu regenerator (2.5 and 5 cm)0.50 $\pm$ 0.1019 + 0.35 $\pm$ 0.15201642. Spark chambers without magnetic field, regenerator of $C_S^0$ from target with regenerated $K_S^0$ 21: Spark chambers in magnetic field0.50 $\pm$ 0.1019 + 0.35 $\pm$ 0.152010.50 $\pm$ 0.1019 + 0.35 $\pm$ 0.15201. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu)0.445 $\pm$ 0.03424 0.480 $\pm$ 0.02425	Oscillations in the $K^0 \rightarrow \pi^* \pi^-$ decay of scattered kaons <sup>8</sup> :		
Ratio of coherently- and diffraction-regenerated $K_S^{0}$ 10:0.84 $\pm$ $\begin{pmatrix} 0.29 \\ 0.22 \end{pmatrix}$ 1641. 30- inch propane bubble chamber, Fe regenerator $0.84 \pm$ $\begin{pmatrix} 0.29 \\ 0.22 \end{pmatrix}$ 1642. Magnetic spectrometer with spark chambers, Cu regenerator $0.41 \pm 0.25 \\ -0.20 \end{pmatrix}$ 164Coherent regeneration as function of regenerator thickness 13: $0.76 \pm 0.20^{14}$ 1641. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14}$ 1642. Spark chambers without magnetic field, Fe regenerator $0.72 \pm 0.15^{15}$ 1643. Magnetic spectrometer with spark chambers, Cu and Al regenerators $0.53 \pm 0.10 \\ -0.11$ 1651. Magnetic spectrometer with spark chambers, Cu regenerator (2.5 and 5 cm) $0.50 \pm 0.10^{19}$ 1642. Spark chambers without magnetic field, regenerators of C (10.2 cm) and U (6.25 cm) $0.50 \pm 0.15^{20}$ $0.50 \pm 0.15^{20}$ 1. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) $0.445 \pm 0.034^{24}$ $0.445 \pm 0.034^{24}$ 2. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (C) $0.445 \pm 0.024^{25}$	30-inch deuterium bubble chamber	$+0.56 \pm 0.16^9$	72
1. 30- inch propane bubble chamber, Fe regenerator $0.84 \pm \frac{0.29}{0.22}$ 1642. Magnetic spectrometer with spark chambers, Cu regenerator $0.41 \pm 0.25_{12} - 0.20$ 1642. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14} - 0.20$ 1642. Spark chambers without magnetic field, Fe regenerator $0.76 \pm 0.20^{14} - 0.20$ 1643. Magnetic spectrometer with spark chambers, Cu and Al regenerators $0.72 \pm 0.15^{15} - 0.20^{14} - 0$	Ratio of coherently- and diffraction-regenerated K <sup>6</sup> <sub>S</sub> <sup>10</sup> :		
2. Magnetic spectrometer with spark chambers, Cu regenerator $0.41 \stackrel{+ 0.25}{_{-0.20}} \stackrel{+ 0.25}{_{-0.20}}$ Coherent regeneration as function of regenerator thickness <sup>13</sup> : $0.41 \stackrel{+ 0.25}{_{-0.20}} \stackrel{+ 0.20}{_{-0.20}}$ 1. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14}$ 2. Spark chambers without magnetic field, Fe regenerator $0.76 \pm 0.20^{14}$ 3. Magnetic spectrometer with spark chambers, Cu and Al regenerators $0.53 \stackrel{+ 0.10}{_{-0.11}}$ Interference of $K_S^0$ coherently regenerated in two regenerators (2.5 and 5 cm) $0.50 \pm 0.10^{19}$ 2. Spark chambers without magnetic field, regenerators of C (10.2 cm) and U (6.25 cm) $0.50 \pm 0.15^{20}$ Interference of $K_S^0 + \pi^*\pi^-$ and $K_S^0 + \pi^*\pi^{-23}$ : $+ 0.44 \pm 0.06^{22}$ I. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) $0.445 \pm 0.034^{24}$ 2. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (C) $0.480 \pm 0.024^{25}$	1. 30-inch propane bubble chamber, Fe regenerator	$0.84 \pm \frac{0.29_{11}}{0.22}$	164
Coherent regeneration as function of regenerator thickness 13:1. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14}$ 2. Spark chambers without magnetic field, Fe regenerator $0.72 \pm 0.15^{15}$ 3. Magnetic spectrometer with spark chambers, Cu and Al regenerators $0.53 \pm 0.10$ 1. Magnetic spectrometer with spark chambers, Cu regenerator (2.5 and 5 cm) $0.50 \pm 0.10^{19}$ 2. Spark chambers without magnetic field, regenerators of C (10.2 cm) and $0.50 \pm 0.15^{20}$ U (6.25 cm) $0.55 \pm 0.15^{20}$ Interference of K <sup>0</sup> <sub>S</sub> from target with regenerated K <sup>0</sup> <sub>S</sub> $^{21}$ :Spark chambers in magnetic field $* 0.44 \pm 0.06^{22}$ Interference of K <sup>0</sup> <sub>S</sub> $\rightarrow \pi^+\pi^-$ and K <sup>0</sup> <sub>S</sub> $\rightarrow \pi^+\pi^-$ <sup>23</sup> :1. Magnetic spectrometer with spark chambers, K <sup>0</sup> <sub>S</sub> from regenerator (Cu)2. Magnetic spectrometer with spark chambers, K <sup>0</sup> <sub>S</sub> from regenerator (C)3. Magnetic spectrometer with spark chambers, K <sup>0</sup> <sub>S</sub> from regenerator (Cu)3. Magnetic spectrometer with spark chambers, K <sup>0</sup> <sub>S</sub> from regenerator (Cu)3. Magnetic spectrometer with spark chambers, K <sup>0</sup> <sub>S</sub> from regenerator (C)3. Magnetic spectrometer with spark chambers, K <sup>0</sup> <sub>S</sub> from regenerator (C)3. Magnetic spectrometer with spark chambers, K <sup>0</sup> <sub>S</sub> from regenerator (C)	2. Magnetic spectrometer with spark chambers, Cu regenerator	$0.41 + 0.25_{12} - 0.20$	
1. Magnetic spectrometer with spark chambers, Cu regenerator $0.76 \pm 0.20^{14}$ 2. Spark chambers without magnetic field, Fe regenerator $0.72 \pm 0.15^{15}$ 3. Magnetic spectrometer with spark chambers, Cu and Al regenerators $0.53 \pm 0.10$ Interference of K <sup>0</sup> <sub>S</sub> coherently regenerated in two regenerator (2.5 and 5 cm) $0.50 \pm 0.10^{19}$ 2. Spark chambers without magnetic field, regenerator of C (10.2 cm) and $0.50 \pm 0.15^{20}$ U (6.25 cm) $0.55 \pm 0.15^{20}$ Interference of K <sup>0</sup> <sub>S</sub> from target with regenerated K <sup>0</sup> <sub>S</sub> $^{21}$ :Spark chambers in magnetic field $+ 0.44 \pm 0.06^{22}$ Interference of K <sup>0</sup> <sub>S</sub> $\rightarrow \pi^+\pi^-$ and K <sup>0</sup> <sub>S</sub> $\rightarrow \pi^+\pi^-$ <sup>23</sup> :1. Magnetic spectrometer with spark chambers, K <sup>0</sup> <sub>S</sub> from regenerator (Cu) $0.445 \pm 0.034^{24}$ 2. Magnetic spectrometer with spark chambers, K <sup>0</sup> <sub>S</sub> from regenerator (C) $0.445 \pm 0.024^{25}$	Coherent regeneration as function of regenerator thickness <sup>13</sup> :		1
2. Spark chambers without magnetic field, Fe regenerator $0.72 \pm 0.15^{15}$ 3. Magnetic spectrometer with spark chambers, Cu and Al regenerators $0.72 \pm 0.15^{15}$ 1. Magnetic spectrometer with spark chambers, Cu regenerators $0.53 \pm 0.10$ 2. Spark chambers without magnetic field, regenerators of C (10.2 cm) and $0.50 \pm 0.10^{19}$ 2. Spark chambers in magnetic field $1^{17}$ . 181. Interference of K <sup>o</sup> <sub>S</sub> from target with regenerated K <sup>o</sup> <sub>S</sub> . $1^{21}$ :Spark chambers in magnetic field $1^{17}$ .1. Magnetic spectrometer with spark chambers, K <sup>o</sup> <sub>S</sub> from regenerator (Cu) $0.445 \pm 0.034^{24}$ 2. Magnetic spectrometer with spark chambers, K <sup>o</sup> <sub>S</sub> from regenerator (C) $0.448 \pm 0.024^{25}$	1. Magnetic spectrometer with spark chambers, Cu regenerator	$0.76 \pm 0.20^{14}$	
3. Magnetic spectrometer with spark chambers, Cu and Al regenerators $0.53 + 0.10 - 0.11$ Interference of $K_S^0$ coherently regenerated in two regenerators $^{17, 18}$ $0.50 \pm 0.10^1 - 0.11$ 1. Magnetic spectrometer with spark chambers, Cu regenerator (2.5 and 5 cm) $0.50 \pm 0.10^{19}$ 2. Spark chambers without magnetic field, regenerators of C (10.2 cm) and $+ 0.35 \pm 0.15^{20}$ U (6.25 cm) $100 \pm 0.000^{19}$ Interference of $K_S^0 + \pi^* \pi^-$ and $K_S^0 \to \pi^* \pi^{-23}$ : $+ 0.44 \pm 0.06^{22}$ Interference of $K_S^0 \to \pi^* \pi^-$ and $K_S^0 \to \pi^* \pi^{-23}$ : $0.445 \pm 0.034^{24}$ 1. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (C) $0.448 \pm 0.024^{25}$	2. Spark chambers without magnetic field, Fe regenerator	$0.72 \pm 0.15^{15}$	
5. Magnetic spectrometer with spark chambers, Cu and Al regenerators $0.53^{-} - 0.11$ Interference of $K_S^0$ coherently regenerated in two regenerators $^{17, 18}$ $0.50 \pm 0.10^{19}$ 1. Magnetic spectrometer with spark chambers, Cu regenerator (2.5 and 5 cm) $0.50 \pm 0.10^{19}$ 2. Spark chambers without magnetic field, regenerators of C (10.2 cm) and $+ 0.35 \pm 0.15^{20}$ U (6.25 cm) $0.625 \pm 0.15^{20}$ Interference of $K_S^0 + \pi^* \pi^-$ and $K_S^0 \to \pi^* \pi^{-23}$ : $+ 0.44 \pm 0.06^{22}$ Interference of $K_S^0 \to \pi^* \pi^-$ and $K_S^0 \to \pi^* \pi^{-23}$ : $0.445 \pm 0.034^{24}$ 1. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (C) $0.448 \pm 0.024^{25}$	2 Manualia ana atau mithamba hamba na Guard Alamana ana	$0.52 \pm 0.10$	
Interference of $K_S^0$ coherently regenerated in two regenerators $^{17, 18}$ 1. Magnetic spectrometer with spark chambers, Cu regenerator (2.5 and 5 cm) $0.50 \pm 0.10^{19}$ 2. Spark chambers without magnetic field, regenerators of C (10.2 cm) and $+ 0.35 \pm 0.15^{20}$ U (6.25 cm) $10^{16}$ Interference of $K_S^0$ from target with regenerated $K_S^0$ $^{21}$ :Spark chambers in magnetic field $+ 0.44 \pm 0.06^{22}$ Interference of $K_S^0 \rightarrow \pi^+\pi^-$ and $K_S^0 \rightarrow \pi^+\pi^{-23}$ : $0.445 \pm 0.034^{24}$ 1. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (C) $0.445 \pm 0.034^{24}$	3. Magnetic spectrometer with spark chambers, Cu and Al regenerators	0.53 - 0.11	
1. Magnetic spectrometer with spark chambers, Cu regenerator (2.5 and 5 cm) $0.50 \pm 0.10^{19}$ 2. Spark chambers without magnetic field, regenerators of C (10.2 cm) and $+ 0.35 \pm 0.15^{20}$ U (6.25 cm)       1000000000000000000000000000000000000	Interference of K <sup>0</sup> <sub>S</sub> coherently regenerated in two regenerators <sup>17, 18</sup>		
2. Spark chambers without magnetic field, regenerators of C (10.2 cm) and U (6.25 cm) $+ 0.35 \pm 0.15^{20}$ Interference of $K_S^0$ from target with regenerated $K_S^{0-21}$ : Spark chambers in magnetic field $+ 0.44 \pm 0.06^{22}$ Interference of $K_S^0 \rightarrow \pi^+\pi^-$ and $K_S^0 \rightarrow \pi^+\pi^{-23}$ : $+ 0.44 \pm 0.06^{22}$ I. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) $0.445 \pm 0.034^{24}$ 2. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (C) $0.480 \pm 0.024^{25}$	1. Magnetic spectrometer with spark chambers, Cu regenerator (2.5 and 5 cm)	$0.50 \pm 0.10^{19}$	
Interference of $K_S^0$ from target with regenerated $K_S^0$ $^{21}$ :Spark chambers in magnetic field $+ 0.44 \pm 0.06^{22}$ Interference of $K_S^0 \rightarrow \pi^*\pi^-$ and $K_S^0 \rightarrow \pi^*\pi^{-23}$ : $- 0.445 \pm 0.034^{24}$ 1. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) $0.445 \pm 0.034^{24}$ 2. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (C) $0.480 \pm 0.024^{25}$	2. Spark chambers without magnetic field, regenerators of C (10.2 cm) and U (6.25 cm)	$+0.35\pm0.15^{20}$	
Spark chambers in magnetic field $+ 0.44 \pm 0.06^{22}$ Interference of $K_S^0 \rightarrow \pi^*\pi^-$ and $K_S^0 \rightarrow \pi^*\pi^{-23}$ :1. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) $0.445 \pm 0.034^{24}$ 2. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (C) $0.480 \pm 0.024^{25}$	Interference of $K_{E}^{0}$ from target with regenerated $K_{E}^{0-21}$ ;		
Interference of $K_S^0 \rightarrow \pi^+\pi^-$ and $K_S^0 \rightarrow \pi^+\pi^{-23}$ : 1. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (Cu) 0.445 ± 0.034^{24} 2. Magnetic spectrometer with spark chambers, $K_S^0$ from regenerator (C) 0.480 ± 0.024^{25}	Spark chambers in magnetic field	$+0.44 \pm 0.06^{22}$	
1. Magnetic spectrometer with spark chambers, $K_S^6$ from regenerator (Cu) $0.445 \pm 0.034^{24}$ 2. Magnetic spectrometer with spark chambers, $K_S^6$ from regenerator (C) $0.480 \pm 0.024^{25}$	Interference of $K_{C}^{0} \rightarrow \pi^{+}\pi^{-}$ and $K_{C}^{0} \rightarrow \pi^{+}\pi^{-23}$ :		
2. Magnetic spectrometer with spark chambers, K <sup>6</sup> <sub>2</sub> from regenerator (C) 0.480 ± 0.024 <sup>25</sup>	1. Magnetic spectrometer with spark chambers, KS from regenerator (Cu)	$0.445 \pm 0.034^{24}$	
	2. Magnetic spectrometer with spark chambers, $K_{S}^{0}$ from regenerator (C)	0.480 ± 0.024 <sup>25</sup>	

Notes: 1. The table includes the results obtained with accuracy better than  $\pm \ 0.3$  .

2. The absence of a sign in front of most results indicates that the absolute value  $|m_L - m_S|$  was determined in these experiments.

- <sup>1</sup>S. Treiman et al., Phys. Rev. 103, 1545 (1956).
- <sup>2</sup>B. Aubert et al., Phys. Lett. 17, 59 (1965).
- <sup>3</sup>W. Fry et al., Phys. Rev. 109, 2212 (1958).
- $^{4}$ U. Camerini et al., Phys. Rev. 128, 362 (1962) and Erratum.
  - <sup>5</sup>U. Camerini et al., Phys. Rev. 150, 1148 (1966).
  - <sup>6</sup>C. Chang et al., Phys. Lett. 23, 702 (1966).
  - <sup>7</sup>D. Hill et al., BNI-Preprint 10608 (1967).
  - <sup>8</sup>U. Camerini et al., Nuovo Cimento 28, 1096 (1963).
  - <sup>9</sup>J. Canter et al., Phys. Rev. Lett. 17, 942 (1966).
  - <sup>10</sup> M. Good, Phys. Rev. 110, 550 (1958).
  - <sup>11</sup> M. Good, Phys. Rev. 124, 1223 (1961).
  - <sup>12</sup>J. Christenson et al., Phys. Rev. B140, 74 (1964).
  - <sup>13</sup> M. Good, Phys. Rev. 110, 550 (1958).

<sup>14</sup> J. Christenson et al., Phys. Rev. B140, 74 (1964).

<sup>15</sup> T. Fujii et al., Phys. Rev. Lett. 13, 253 (1964).

<sup>16</sup> M. Ya. Balats et al., Yad. Fiz. 7, 217 (1968) [Sov. J. Nuc. Phys. 7, 157 (1968)].

<sup>17</sup> I. Kobzarev and L. Okun', Zh. Eksp. Teor. Fiz. 39, 605 (1960) [Sov. Phys.-JETP 12, 426 (1961)].

- <sup>18</sup>S. Matinyan, ibid. 39, 1481 (1960) [12, 1028 (1961)].
- <sup>19</sup> J. Christenson et al., Phys. Rev. **B140**, 74 (1964).
- <sup>20</sup> J. Jovanovich et al., Phys. Rev. Lett. 17, 1075
- (1966).
- <sup>21</sup>W. A. Melhop et al., Bull. Amer. Phys. Soc. 9, 722 (1964).

<sup>22</sup>W. A. Melhop et al., Proc. Berkeley Conference (1966).

<sup>23</sup> V. Lyuboshitz et al., Yad. Fiz. 1, 497 (1965) [Sov. J. Nuc. Phys. 1, 354 (1965)].

- <sup>24</sup> M. C. Alff-Steinberger et al., Phys. Lett. 21, 595 (1966).
- <sup>25</sup> M. Bott-Bodenhausen et al., Phys. Lett. 23, 277 (1966).