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Abstract

The Soudan 2 detector is used to search for evidence of nucleon decay. Particular emphasis is put on searches for modes with multiple-charged particles in the final state, and for modes suggested by super-symmetric theories.

Mode	$\epsilon \times B$	BKG	Data	kT-yr	10^{30} yr	PDG98
νK^+				3.56	43	100
$K^+ \rightarrow \pi^+ \pi^0$	5.5%	1.1	0			
$K^+ \rightarrow \mu^+ \nu_\mu$	9.0%	0.4	1			
$p \rightarrow \mu^+ \mu^+ \mu^-$	31%	0.5	0	3.56	142	190
νK_S^0				4.41	59	86
$K_S^0 \rightarrow \pi^+ \pi^-$	17%	6.1	7			
$K_S^0 \rightarrow \pi^0 \pi^0 (3S)$	3%	3.4	7			
$K_S^0 \rightarrow \pi^0 \pi^0 (4S)$	5%	1.2	2			
$n \rightarrow \nu \pi^0$	11%	2.6	4	3.56	21	100
$n \rightarrow \nu \eta^0$	7%	0.7	0	3.56	32	54
$p \rightarrow \nu \pi^+$	4.6%	6.0	5	3.56	6.9	25
$n \rightarrow \nu e^+ e^-$	20%	1.6	1	3.56	68	74
$n \rightarrow e^+ \pi^0$	9%	0.9	0	3.56	38	550
$p \rightarrow e^+ K_S^0$				4.41	117	76
$K_S^0 \rightarrow \pi^+ \pi^-$	15%	0.61	1			
$K_S^0 \rightarrow \pi^0 \pi^0$	8%	0.42	0			
$p \rightarrow \mu^+ K_S^0$				4.41	151	64
$K_S^0 \rightarrow \pi^+ \pi^-$	16%	< 0.24	0			
$K_S^0 \rightarrow \pi^0 \pi^0$	6%	0.61	0			
$p \rightarrow e^+ K_L^0$	11%	3.5	2	4.41	51	44
$p \rightarrow \mu^+ K_L^0$	12%	0.37	0	4.41	83	44

Table 1: Nucleon Decay limits set by Soudan 2

The Soudan 2 collaboration has analyzed its contained event sample for the evidence of nucleon decay. Limits in a number of decay modes are shown in Table 1. Details about the analysis can be found in Allison et al., and Wall et al.

References

Allison, W.W.A. et al., Phys. Lett. B427, 217 (1998).
Wall, D. et al., submitted to Physical Review, (1999).

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