

Dynamic Range

Ion Chamber Response

			Given		Calculated		Estimated		Max		IC Sensitivity		I/F	
			KE Range		Mom. Range		Maximum		Electrons/pulse		Min. ions/pulse		Minimum	
			GeV/Nucleon		GeV/c		Ions/Pulse		(6.25e18 ch/C)		20 dB S/N		Dynamic Range	
			GeV/Nucleon		GeV/c		Ions/Pulse		100 pairs/cm		Noise floor 20 pA		Needed	
Species	Mass	Z	Z ²	Min	Max	Min	Max	1.00E+09	One cm Argon	micro-Coulombs	1 second spill	Actual	dB's	
H ¹	1	1	1	0.1	3.07	0.5	3.9	100	1.00E+13	1.6	1.3E+07	8.E+03	78	
Si ²⁸	28	14	196	0.09	1.23	2.2	8.4	4	7.80E+13	12.5	6.4E+04	6.E+04	96	
Fe ⁵⁶	56	26	626	0.1	1.1	3.3	11.2	0.4	2.50E+13	4	2.0E+04	2.E+04	86	
Cu ⁶³	63	29	841	0.1	1.04	3.6	11.5	1	8.40E+13	13.4	1.5E+04	7.E+04	97	
Au ¹⁹⁷	197	79	6241	0.04	0.3	4.0	10.9	2	1.25E+15	199.7	2.0E+03	1.E+06	120	

Detector sensitivity for 1 GeV/n Fe (particles/second)

<u>Profiles</u>	Low	High	<u>Intensity</u>	Low	High
Flags	1e6?	>1e9	Ion Chambers	1e4	1e9-1e10
SWIC's	1e4	>1e9	Scintillators	1	1e6-1e7