

CYGNUS Background Simulation

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Summary of gamma simulations from readout materials

<u>Readout</u>	<u>Material</u>
GEMs	Copper, Kapton
MuPics	Polymid
Wires	Steel, Aluminium oxyde (ceramics),
Pixel chips	Copper, Aluminium, Tantalum

Summary of backgrounds (Wires)

10x10x10m³, 50Torr SF₆, events between 1 and 100 keVr

Material	Neutrons (/3years)	Gamma (3/year)
Muon induced neutrons	9±4	
Vessel (Acrylic)	0.415±0.003	(8.416±0.006)x10 ⁷
Read out (steel)	(6.78±0.02)x10 ⁻²	(2.275±0.001)x10 ⁵
Readout (ceramics)	259±1	(6.33±0.02)x10 ⁸

Acrylic Vessel : 2.35ppt U, 16.73ppt Th, 67.83ppb K40 (SNO+)

Summary of backgrounds (Gems)

10x10x10m³, 50Torr SF₆, events between 1 and 100 keVr

Material	Neutrons (/3years)	Gamma (3/year)
Muon induced neutrons	9±4	
Vessel (Acrylic)	0.415±0.003	(8.416±0.006)x10 ⁷
Read out (Copper)	<3.11	(1.4106±0.0005)x10 ⁸
Readout (Kapton)	67.20±0.34	(7.545±0.003)x10 ⁸

Summary of backgrounds (mupics)

10x10x10m³, 50Torr SF₆, events between 1 and 100 keVr

Material	Neutrons (/3years)	Gamma (3/year)
Muon induced neutrons	9±4	
Vessel (Acrylic)	0.415±0.003	(8.416±0.006)x10 ⁷
Read out (Polymid)	(1.169±0.005)x10 ⁵	>2.367x10 ¹¹ (K40?)

CYGNUS 10

- 10m^3 , 200Torr SF₆ 560Torr He

	Neutrons	gammas (prior to disc.)
TPC vessel	0.216 ± 0.001	$(2.5 \pm 0.2) \times 10^6$
Field cage acrylic	$(7.06 \pm 0.05) \times 10^{-2}$	$(3.14 \pm 0.02) \times 10^5$
Field cage resistors and ceramics	26.90 ± 0.05	$(1.181 \pm 0.004) \times 10^7$
Central cathode	$(6.53 \pm 0.02) \times 10^{-7}$	$(2.07 \pm 0.02) \times 10^5$
HV feedthrough	$(2.34 \pm 0.02) \times 10^{-1}$	$(8.93 \pm 0.05) \times 10^5$
ThGEM readout planes	< 7.28	< 4.8×10^6