

Beam background in the fDiRC

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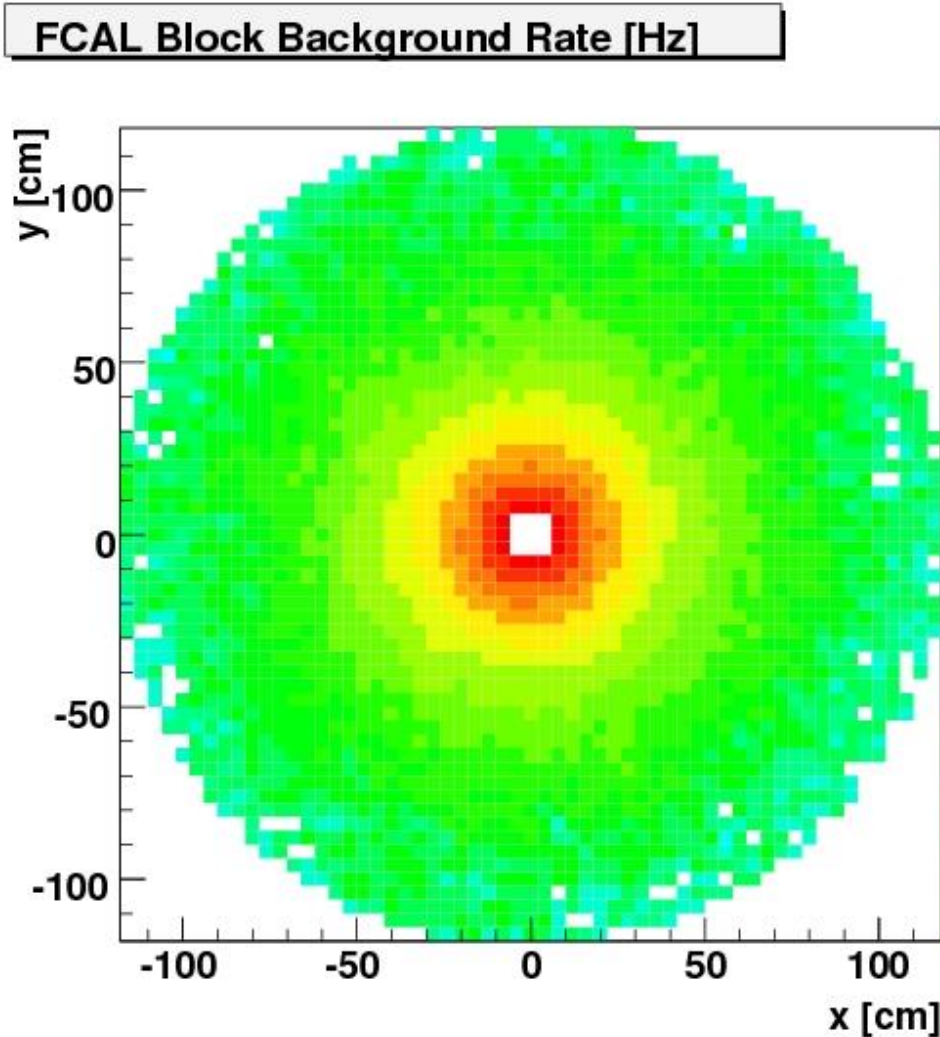
Justin Stevens

Baptiste Guegan

Method

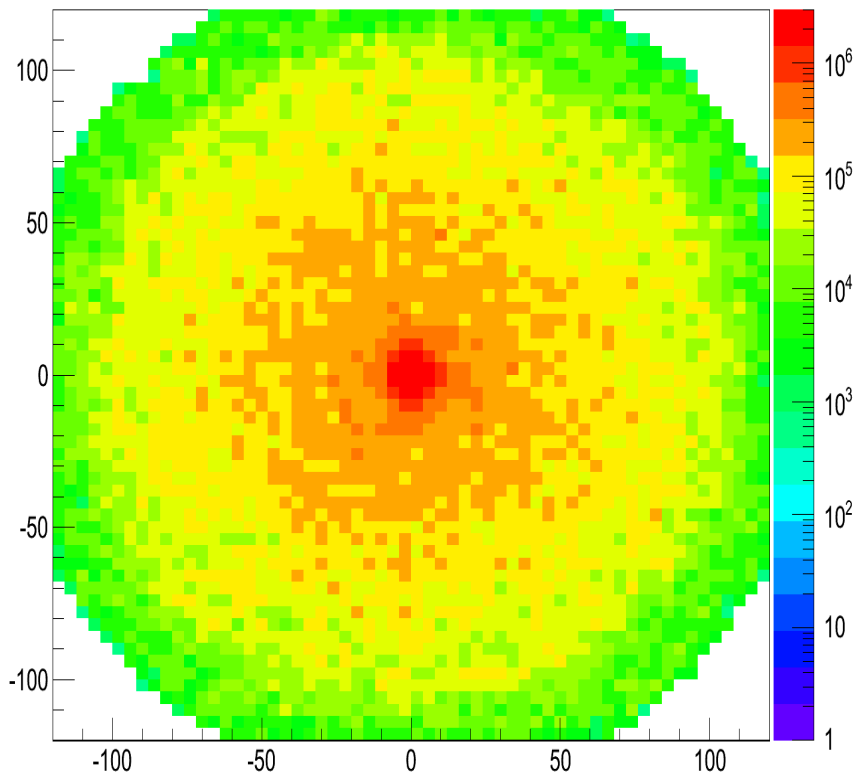
- Generate 10K pythia events with and without beam photons
 - Used +/- 100ns window, 10^8 luminosity
- Place detector plane at 630cm in detector coordinates
- Scale appropriately
 - Overestimates hadronic (pythia) rate, but this is negligible

Previous studies

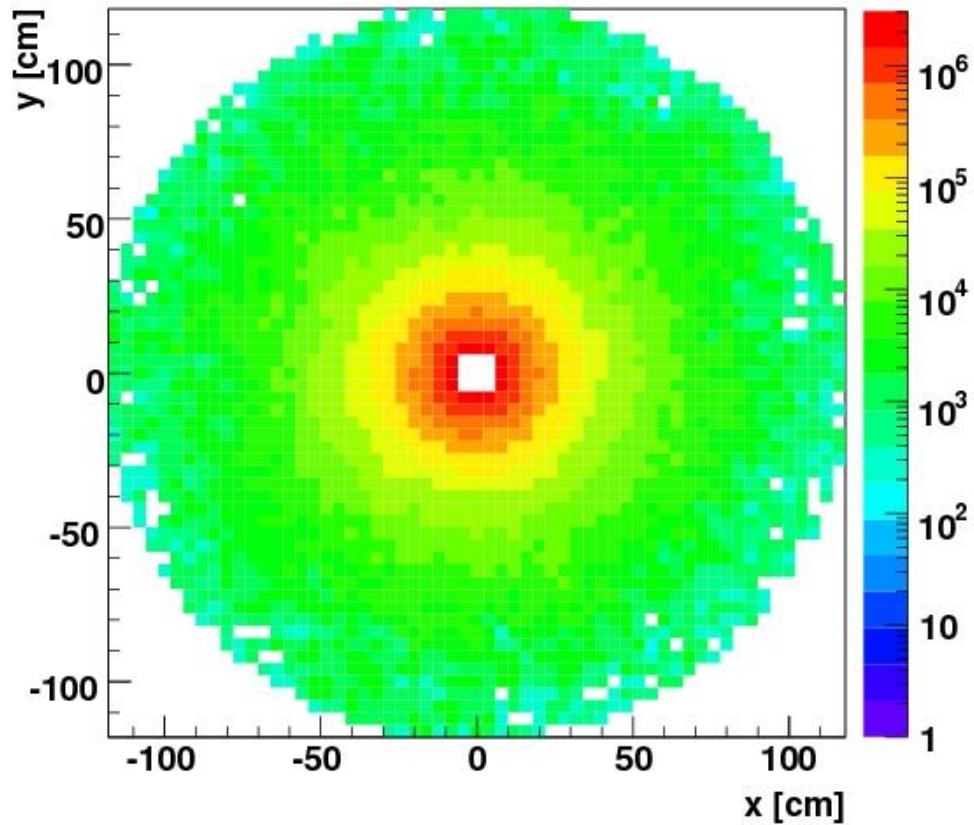


- From the FCAL study in 2007
- Luminosity = $8 \cdot 10^7$
- At 5cm, rate is $\sim 2 \text{ MHz/cm}$

Block rate at DiRC location (Hz/4x4cm)



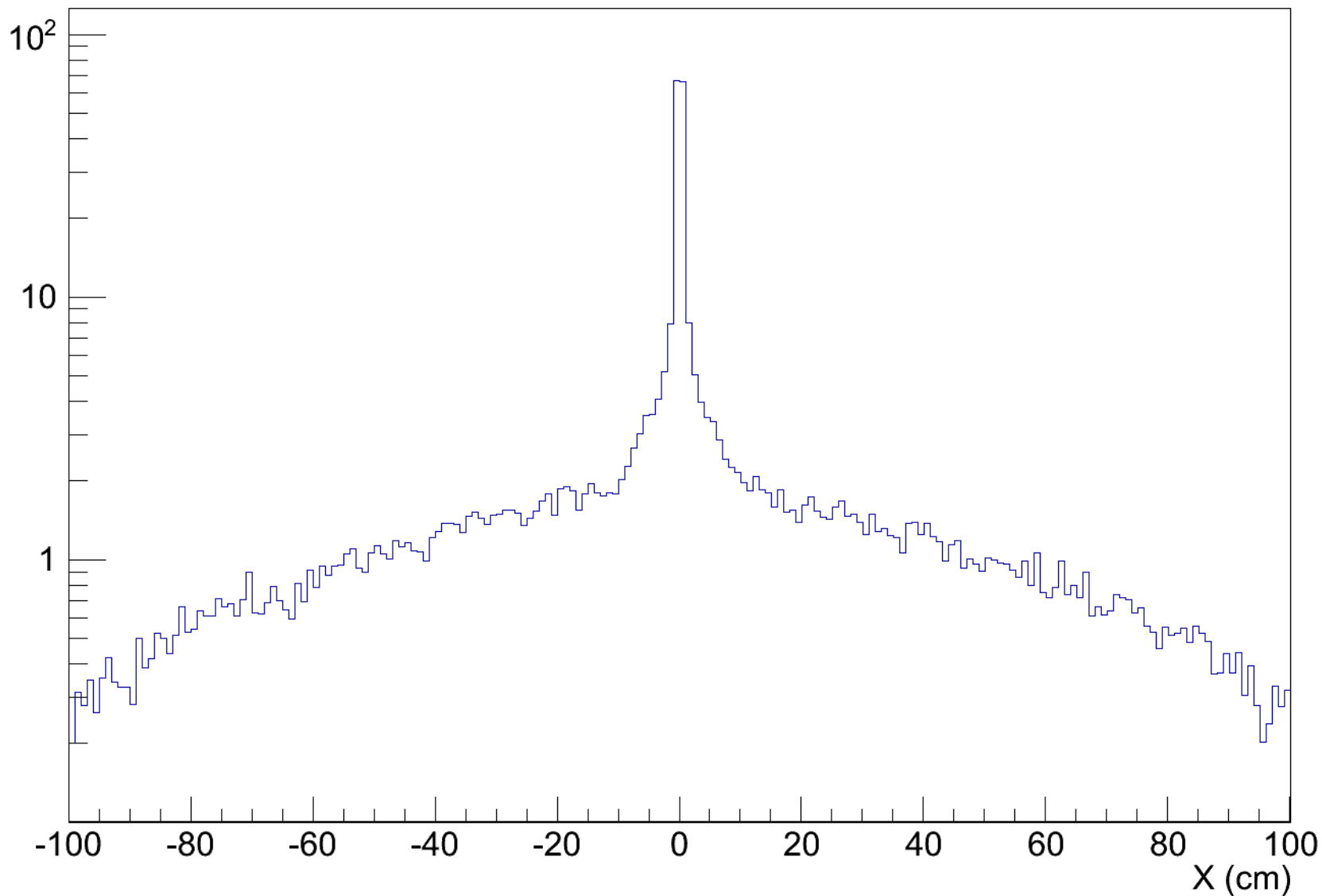
FCAL Block Background Rate [Hz]



Convert hits to photons

- Electrons saturate Cerenkov
 - 25 Cerenkov photons
- Photons convert in 12% of X_0 to 2 electrons
 - Average 3 Cerenkov photons per EM photon
- Scale to a 100ns window

DiRC photons in 100ns (1/cm)



Conclusions

- After the central peak, background is fairly flat
- If bars are 15cm from beam line, expect ~ 150 background photons per window.