

Single Photon Detection by Nb/Al-STJ with Cryogenic Amplifier for COBAND experiment

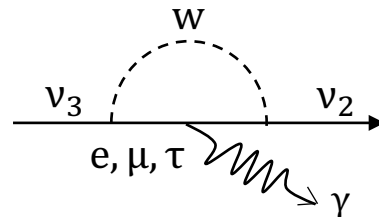
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- Search for the cosmic background neutrino decay, and measure neutrino mass from the decay.

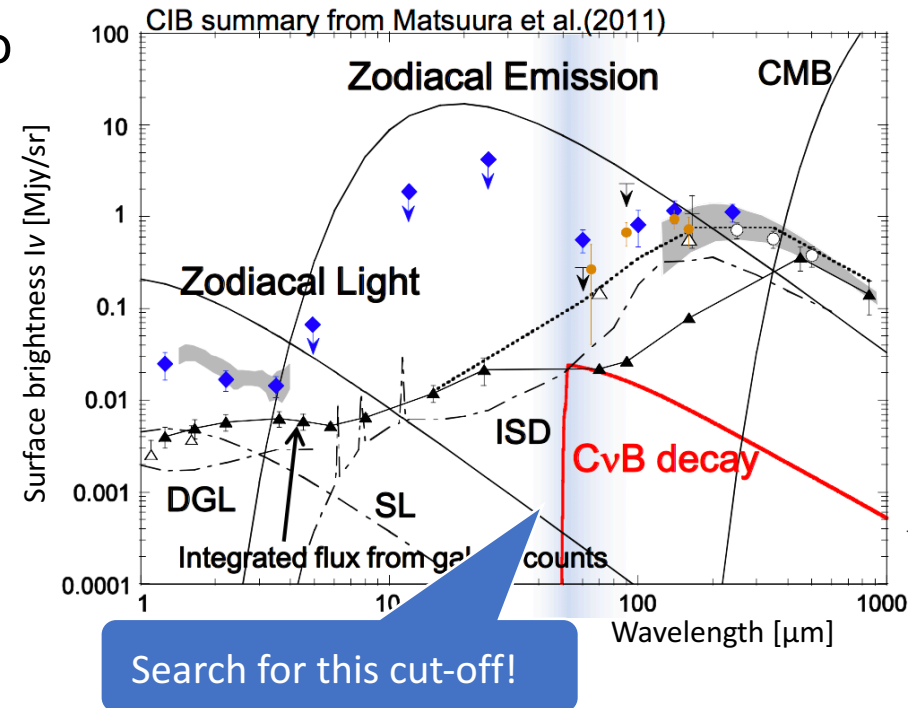
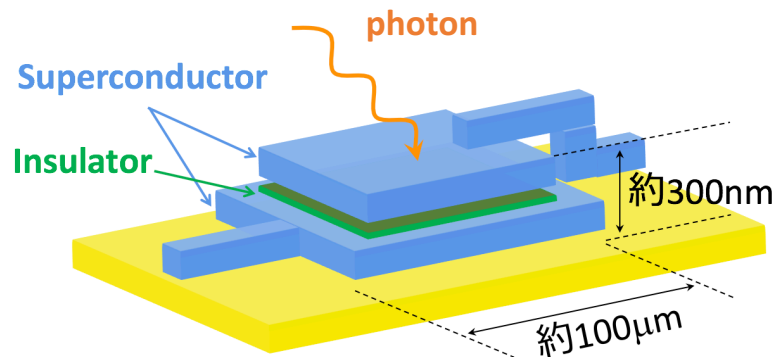
Photon energy from ν -decay (25meV)

$$E_\gamma = \frac{m_3^2 - m_2^2}{2m_3}$$

(CM system)

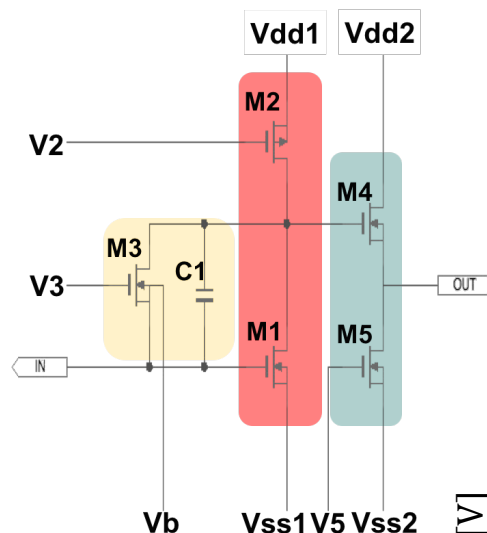
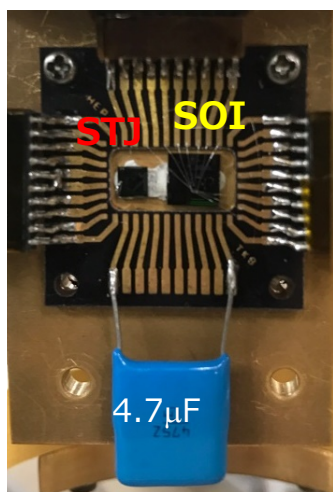


- Superconducting Tunnel Junction (STJ) is Josephson device



A photon absorbed in the superconductor breaks cooper pairs and creates tunneling current of quasi-particles proportional to the deposited photon energy.

- R&D of cryogenic preamplifier placed close to STJ in the refrigerator. We use FD-SOI FET (Fully depleted silicon on insulator FET)



- STJ signal amplification with the cryogenic pre-amplifier
- I estimate the number of photon which irradiated STJ, and consider possibility of single photon counting by SOI-amp.

