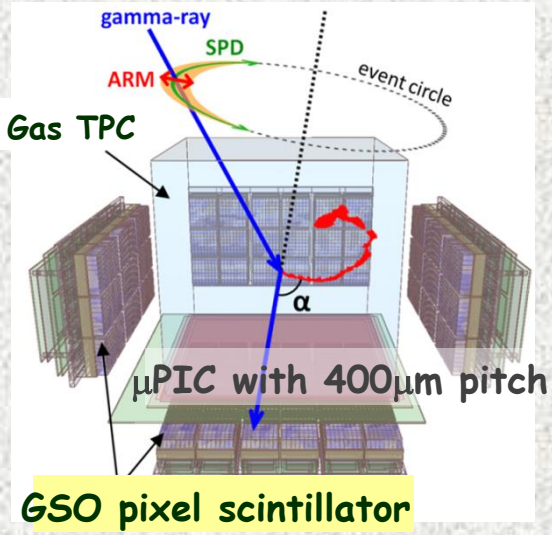
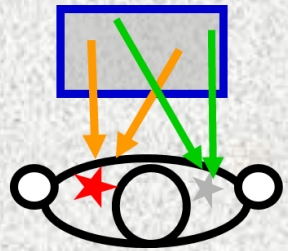
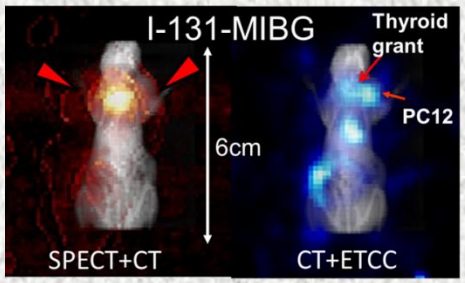
Development Electron Tracking Compton Camera (ETCC) for multipurpose medical imaging (T.Tanimori et al. Kyoto Univ. Japan)

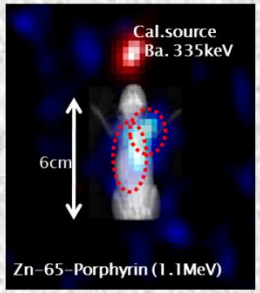
- direction of photon by photon with SPD useful for Noise cut. & Clear Imaging
- Noise Reduction by dE/dx
- Large FoV >3str(good for monitoring)



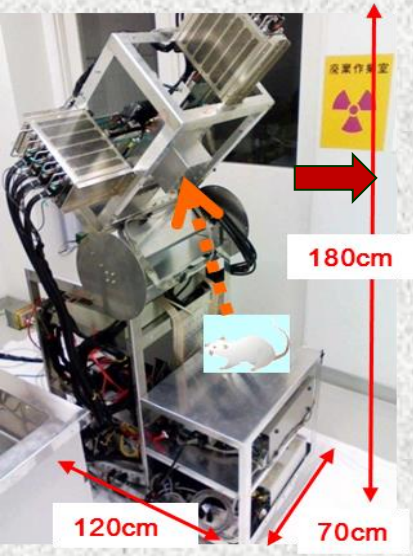


Clear images for >300keV γ in mice (08-12)

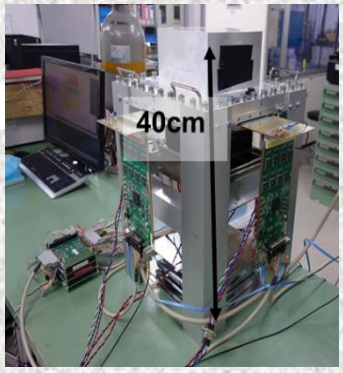




1st Medical 10cm-cube ETCC(06~12)

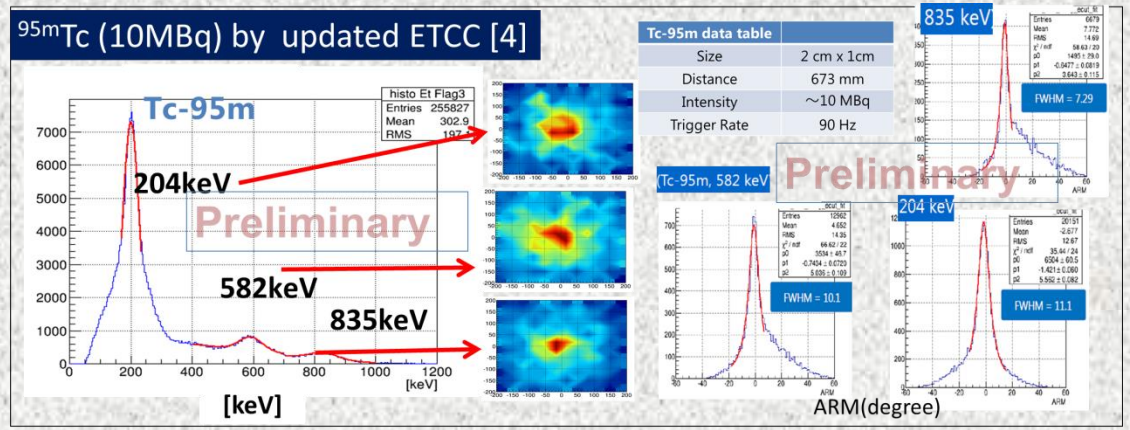


Updated Med. 10cmETCC (2014)

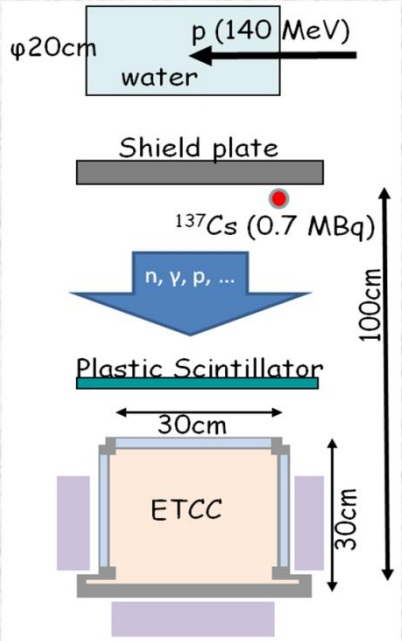


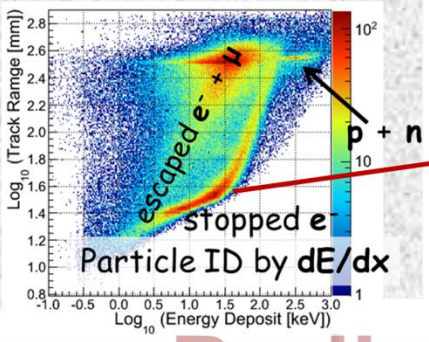
- Tacking efficiency 10% -> 100%
- Fast DAQ 30Hz -> ~1KHz
- Good Angular resolution 10° ->5°

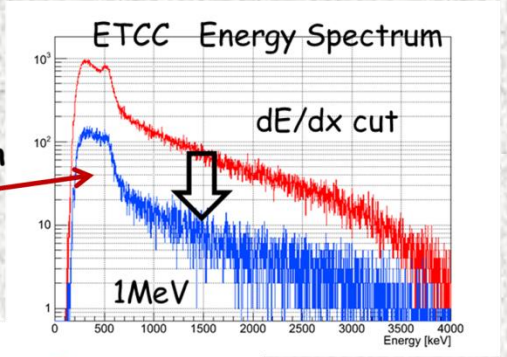
Multicolor image (3 energy γ emission)

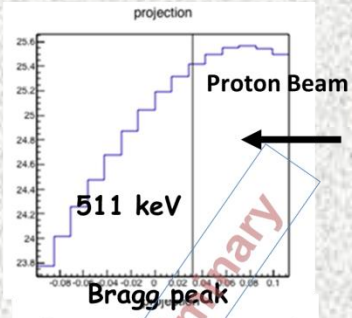


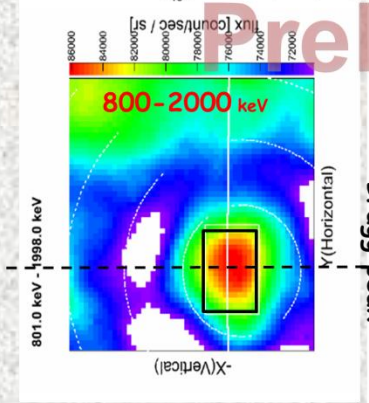
Proton Therapy Beam-on Imaging with advanced ETCC for Astrophysics

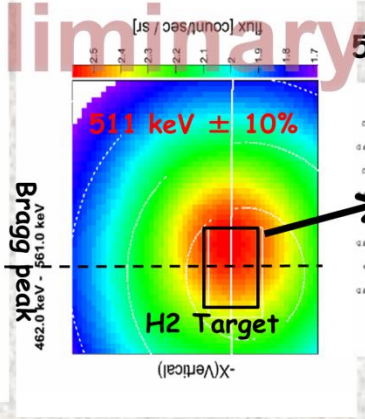


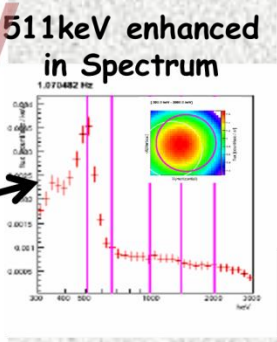


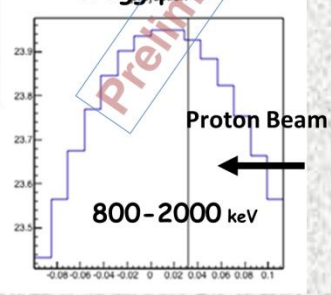




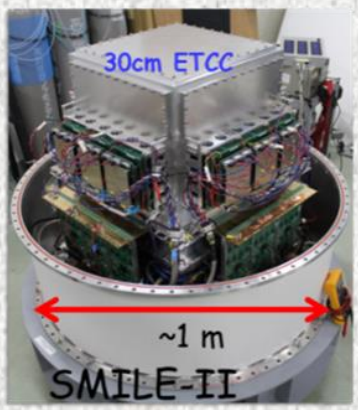








Preliminary



Proton beam intensity	Several sub-nA (~1/3-5 of proton therapy
Measurement time	~ 30 minutes with 50% dead time-> Live time 14min.
# of obtained gamma rays	~ 2×10^4 for all gamma, 8 gammas /s >1MeV

Result: Peak position of the higher energy gamma ray image clearly shifts upper position of the beam line. → It is consistent to the simulation result.

Goal in a few years, Use of 2atm CF_4 with 3r.l. PSAs will increase to ~10^2 gamma >1MeV, which provides 1mm resolution of Bragg peak every second.