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Abstract

1 Beta probe

- Thin detectors (gamma background rejection)
- Resolution 1 mm (?)
- Tracking/merging with visual image
- Current rather than tracking mode
- Few diode dots or arrays
- Obvious application: intraoperative probe for cancer resection (prostatectomy,...)
- Very marketable, however might be scientifically and monetary insubstantial

2 PET probe

- MR compatibility
- Silicon seems to be a good material (low interference, sufficient data)
- Multiplexing!
- Timing. More on the sensor than on electronic side. A bit depending on application. Low efficiency probably means low rate, which might be sometimes OK.
- Application unknown! (screening would be perfect: prostate, cervical cancer, ?)
- Hence, poor marketability
- Issue is to find an application and a vendor prepared to deal with it and allows interfacing the ring
- Could also carry isotope development.

3 Proton CT

- Perfect efficiency in si detectors
- Tracking & tracking algorithms known
- Resolution probably not an issue
- Rates?
- Even standard ATLAS-type electronics is probably sufficient
- Readout?
- Separation between the beam and the decay products - geometry and energy resolution
- Dosimetry with dot-like detectors embedded in tissue (similar project by G. Kramerger for brachiterapy)?
- Connections to facilities (Valencia, Michigan)
- Our advantage is knowledge of radiation damage
- Small market (?)

4 Compton camera

- Push for new isotopes (thyroid disease monitoring/treatment?, In labeled PSMA?)
- Recent advances also push Compton boundaries toward Tc imaging
- Some promising results with multiplication diodes, allowing ≈ 1 keV resolution
- Spatial resolution seems fine
- Some nice results with electron tracking (K. Vetter in Si, Z. He in CZT, japanese group with MWPC) - should we follow that path?
- 2nd detector + electronics might be an issue; especially due to large amount of singles
- risky for marketing

5 CT

- NC probably knows more about this
- Silicon is the best high-res detector available
- Dedicated electronics (MEDIPIX or similar) required
- Compete against CMOS sensors + converters

- Counting an issue for electronics (dynamic range, speed)
- Color imaging
- Competitive field
- Very marketable