

Kinetic Inductance Detectors

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Kinetic Inductance Detectors

- Optical/near-infrared photon counting detectors
 - Also Sub-mm and X-ray devices
- Single photon counting
 - No read-noise
 - No dark current
 - Excellent Cosmic-ray subtraction
- Energy resolving
 - $\lambda/\Delta\lambda \sim 10$ currently
 - ~ 50 demonstrated
 - ~ 150 max
- Large arrays
 - Current 20,000 pixel detectors (UCSB)
 - Future Megapixel arrays

Durham involvement

- Focus on applications
 1. Astronomy
 - Time domain studies
 - High spectral resolution, wide passband spectrograph
 - Massive surveys
 2. Adaptive Optics
 - Ultrafast wave-front sensor for XAO on ELT (STFC PPRP R&D for ELT)
 - Focal-plane wavefront sensing for visible AO
 3. Life sciences
 - EPSRC-funded studentship to explore applications in life sciences
- System design
 1. milliKelvin cryogenics with MSSL
 2. Gen3 read-out using Xilinx RFSoc (STFC “opportunities”)
 3. Cryogenic optics for IR blocking, etc

Opportunities for collaboration

- Device fabrication
 - UCSB leading large arrays, but plenty of scope for others
 - DIAS
 - Cambridge
 - SRON
- Extreme Adaptive Optics
 - Applications for ground/space-based AO
- Data science/analysis
 - High data rates from photon-counting megapixel array
- Cryogenics
 - Current generation operate at 100mK – scaleable to Mpixel?
- Other wavelength ranges
 - UV? Mid-IR?