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KIDSpec –an MKID based medium resolution, integral field spectrograph

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KIDSPec, the Kinetic Inductance Detector Spectrograph, is a novel concept for a highly sensitive, medium spectral resolution optical through near-IR spectrograph. It uses the intrinsic energy resolving capability of an array of optical/IR-sensitive MKIDs to distinguish multiple orders from a low-resolution grating. By acting as an 'order resolver', the MKID array replaces the cross-disperser in an echelle spectrograph. This greatly simplifies the optical layout of the spectrograph and enables longer slits than are possible with cross-dispersed instruments (to improve sky subtraction).
KIDSpec would have similar capabilities to ESO's highly successful X-shooter instrument. It would provide an R=4000-10,000 spectrum covering the optical and near-IR spectral range (0.4-1.5 micrometers). As well as a 'long-slit'mode, the IFU would provide a small (~50 spaxel) field-of-view for spatially resolved sources. In addition, the photon-counting operation of MKIDs and their photon-energy resolving ability enable a read-noise free spectrum with perfect cosmic ray removal. The spectral resolution would be sufficient to remove the bright night-sky lines without the additional pixel noise, making the instrument more sensitive than an equivalent semiconductor-based instrument.
KIDSpec would enhance many existing high-profile science cases, including transient (GRB, SNe, etc.) follow-up, redshift determination of faint objects and transit spectroscopy of exoplanets. In addition it will enable unique science cases, such as dynamical mass estimates of the compact objects in ultra-compact binaries.

Less than 5 years of experience since completion of Ph.D

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Student (Ph.D., M.Sc. or B.Sc.)

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