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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**

N

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

N

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