

PHYSICS DEPARTMENT COLLOQUIUM

“Nano-radian astronomy: Investigating Protoplanetary Disks with Infrared Interferometry”

BY

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Newly-commissioned long-baseline interferometers can scrutinize galactic (and extragalactic) objects with nano-radian angular resolution. This incredible resolution allows us look into the inner accretion disks of young stellar objects (YSOs) in nearby star forming regions. The inner AU of these "protoplanetary" disks plays host to a variety of important and fascinating phenomena: it is the site of magnetospheric accretion lifting material off the disk, the disk material here mediates the orbital migration of newly formed "Hot Jupiter" exoplanets, and, of course, terrestrial planet building occurs in the the inner AU. Near-infrared observations can isolate the hot dust (and molecular) emission arising from the inner disk, since cool outer dust can not efficiently emit at short wavelengths. Here, I will give an overview of recent work in this field, results which have directly challenged existing paradigms of the inner accretion disk and the star-disk connection. Lastly, I will discuss new studies on the horizon, highlighting the possibility of direct imaging of the inner disk using the CHARA interferometer. These high-angular resolution studies will act as the "backbone" for future planet building calculations, providing accurate initial physical conditions of diskmaterial, and should even make direct detection of extrasolar planets possible.

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