New Exozodi and Asteroid Belt Analogs using WISE

Rahul I. Patel (Stony Brook University) with: Stanimir Metchev (UWO, SBU) Aren Heinze (SBU)





This work is partially supported by NASA Origins of Solar Systems

via subcontract No. 1467483









Plethora of discoveries from WISE...

Find Faint Excesses Around Nearby Stars Empirically Calibrate Photospheric Colors

Saturation Corrections

.. To Further Study Debris Disks From A Statistical Standpoint

WISE Mid-IR Bands Probe Zodiacal Dust And Asteroid Belt Regions

W3- Excess: W1-W3 W2-W3

W4- Excess: W1-W4 W2-W4 W3-W4

EMPIRICALLY Search for IR Excess using WISE Colors around Hipparcos stars <75 pc

See Talk by Sasha Hinkley

Bright Stars Were Included By Correcting Trend in Saturated Wings



Sample of Main Sequence Stars

Hipparcos Stars Constrained to within 120 pc and |b|>5°



Calculating Photospheric WISE Colors



$$\Sigma_{E[Wi-Wj]} = \frac{(Wi-Wj) - W_{ij}(B_T - V_T)}{\sigma_{ij}}$$





Incidence Rate Of Excesses (d<75 pc)



<f_d> (W4): FGK: 2.1x10⁻⁴ AB: 6.2x10⁻⁵



New Debris Disks within 75 pc ! Painstaking and Careful treatment of WISE data:

- 214 stars with excesses at 10-30 um \rightarrow ~50% are NEW
- 47% increase of 10-30 um excesses

- Large fraction of W4 excesses are likely warm disks (>100K)
 - Due to aggregate W3 excess