“Welcome to Hawaii, where the Habitable Zone meets the Ice Line”

What Orbits a Mysterious Young “Dipper” Star in Taurus?

Eric Gaidos
Department of Earth Sciences
University of Hawaii at Manoa
The *Kepler* Legacy:
Today is the First Day of the **Next** Ten Years
A Decade of “Deep Learning” about planetary systems
How does the diversity of planets emerge from initial states?
Age Distribution of Kepler Planet Host Stars

**Gyrochronology**

- Barnes et al. 2007
- Mamajek & Hillenbrand 2008
- Meibom et al. 2009

**Isochrones (preliminary)**

Walkowicz & Basri (2013)

Berger et al. in prep
Upper Scorpius

Pleiades

Taurus

Beta Pictoris

Tuc-Hor

Hyades & Praesepe
ALMA (Sub)millimeter telescope

DSHARP Survey (Andrews et al. 2018)
Exchanging Spatial for Temporal Scales

![Graph showing orbital period (days) vs. intensity with TESS minimum, K2, and TESS maximum highlighted.](image)
“Dipper” EPIC 204638512 (RX J1604.3-2130)

Ansdell et al. (2016)

Pinilla et al. (2018)
Mechanisms for Moving Dust Above the Disk

Disintegrating Planetesimals or Comets

Dusty disk wind
Similar dust cross-section and perhaps quasi-universal mass of planetesimals?
Periodic Dippers (AA Tau Like)
Dips are Deeper at Bluer Wavelengths

Faulkes Telescope North photometry

% relative flux vs. time relative to dip center (hours)
(No) Sodium in the Tail of Evaporating Planet K2-22b

Gaidos et al., in press
TESS is discovering dippers!

Identified by citizen scientists

Identified by Ryan Cloutier