Toward a comprehensive view of planet formation and evolution: probing the role of orbital migration in explanatory systems from their observed architecture

Research 1
prevalence of the two mechanisms from stellar obliquity distribution of hot Jupiters

Research 2
physical properties of compact multi-transiting systems

Research 3
validity test using eclipsing hierarchical triple systems

Orbital Migration
through the disk / few-body dynamics

unique photometric tools

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Spin-orbit misalignment in exoplanetary systems

The *planetary orbit* and *host-star rotation* are frequently misaligned in exoplanetary systems.
Origin of the spin-orbit misalignment: Nature or nurture?

1. Misalignment as an initial condition
   protoplanetary disk already misaligned with the stellar spin
   → orbits of multiple planets (if exist) are mutually aligned; only stellar spin is misaligned

2. Misalignment acquired through dynamical evolution
   scattering between multiple planets, secular resonance, perturbation due to the stellar companion…
   → both spin-orbit and orbit-orbit misalignments are possible

Case 1

Case 2
Toward a comprehensive view of planet formation and evolution

**spin-orbit angles** of long-period planets from various **photometric techniques**

+ **3D architecture** from **dynamical analyses** (transit timing/duration variations)

→ **dynamical history of observed systems and the role of migration**