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# EAPS Planetary Lunch Colloquium Series (PICS)

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Tuesday, November 7<sup>th</sup>

12:30pm

54-517

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## The primordial sculpting of exoplanetary system architectures

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For centuries, ideas regarding planet formation were finely tuned to match our own Solar System, with its 8 coplanar planets orbiting a well-aligned star. Now, short-period exoplanetary systems are emerging that exhibit large stellar obliquities, together with mutually inclined planetary orbits, quite literally turning traditional planet formation theory on its head.

In this talk I will describe how stellar obliquity is in fact a natural consequence of planet formation within a dense star cluster. Specifically, gravitational torques from companion stars are capable of tugging the disk out of alignment with the host star. Subsequently, owing to these systems' close-in configuration, stellar oblateness plays a critical role in their dynamical evolution—even modest stellar obliquity will often disrupt the coplanarity of the resulting planetary system. This effect provides a compelling explanation for the so-called Kepler Dichotomy, whereby only half of Kepler transiting systems appear to possess a coplanar architecture. Cumulatively I place stellar obliquity and the Kepler Dichotomy within a common theoretical framework, and discuss avenues toward falsification using upcoming observational efforts.



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