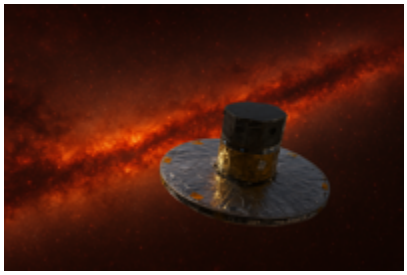

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How to brake a bar: tidal interactions can slow down the bar pattern speed

Wednesday 28 January 2026 12:14 (7 minutes)

In this talk, I will present our recent results showing that tidal interactions can strongly affect the dynamical state of stellar bars, and in extreme cases can effectively halt their rotation. Using controlled interaction models motivated by the XMC system, we find that bars can experience a rapid drop in pattern speed down to nearly zero on short timescales around pericentric passages, while also undergoing substantial weakening and subsequent re-growth. This provides a physically motivated pathway to explain slowly rotating or non-rotating bars in interacting galaxies, and supports the interpretation that the LMC may host a bar in a very low-pattern-speed state. I will close by discussing why these results reinforce the need for caution when interpreting bar properties in cosmological simulations, where numerical resolution and time-dependent environments can bias both bar formation and the inferred bar evolution due to not resolving properly all type of bar stellar orbits.

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