

# Rigorous Constraints on the Formation of Disrupted Asteroid Systems

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A past success of the asteroid fission model was the identification of asteroid pairs that followed the same mass cutoff limit and increased spin periods predicted from a simple binary model of asteroid fission. However, more recent observations have shown that there are some asteroid pairs that violate the limits from this model, in addition detailed observations of some asteroid pair systems show that their larger members are in fact multiple component systems. These observations indicate that the simple physics of the binary fission model may need to be generalized to more complex systems which have several components and bodies at play, as is appropriate for models of asteroids as rubble piles. In this talk I will describe research progress on the generalization of the previously developed asteroid pair fission model to accommodate multiple body systems. For multi-component systems it is possible to develop strong constraints on these systems for when fission can lead to the escape of one or several components. The goal of this work is to develop updated diagnostic tests for asteroid pair systems that could help sort through the possible formation circumstances for these systems, ultimately exposing the underlying physics of asteroid fission.