

On the Origin of Rings around Saturn

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Many studies have investigated rings of Saturn including spacecraft activities such as the Cassini spacecraft. However, their origins and ages are still intensively debated. One of the key questions about Saturn's rings is their ages - Are they old (~billion years old)? or young (~few million years old)? Theorists have proposed several possible origins of rings of Saturn. Rings could form as old as the age of Solar system by tidal disruption of primordial Titan-sized satellite that migrates inward due to gas drag within the circumplanetary gas disk (Canup 2010, Nature). Or rings could form young (~100 million years ago) by recent catastrophic disruption of Saturn's satellites (Cuk et al. 2016, ApJ). Or rings could form either old or young by tidal disruption of a passing object(s) such as Kuiper belt objects or Centaurs during close encounter with giant planets (Hyodo et al. 2017, Icarus). In this talk, I will summarize and discuss current understanding of possible process to form rings around Saturn.

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