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Inside-Out Planet Formation: Onset and Oligarchic Growth of the Vulcans

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Inside-Out Planet Formation (IOPF, Chatterjee & Tan 2014) is a theory of sequential in-situ planet formation from pebble rings that develop at the pressure trap associated with a protoplanetary accretion disk's dead zone inner boundary (DZIB) with a thermally-ionized magneto-rotational-instability (MRI)-active inner zone. The theory naturally predicts the birth of systems of Earth to Super-Earth mass planets at locations about 0.1 au from the host star, with this mass set by truncation of pebble accretion due to shallow gap opening leading to DZIB retreat. Here we present two sub-projects within the IOPF scenario. First, we discuss the onset of IOPF, i.e., the conditions leading to formation of the first and innermost, so-called "Vulcan", planet within the system. Second, we investigate if the late stage of the formation of this Vulcan planet could involve oligarchic growth from a population of Moon-mass protoplanets.