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An In-Situ Formation Model for Systems of Tightly-Packed Inner Planets

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Using high-resolution N-body simulations, we investigate the outcome of terrestrial planet formation at short (< 100 day) orbital periods under a migration-free model. The collisional and dynamical evolution of systems of nearly 10^6 self-interacting planetesimals are directly followed through the final planet assembly phase. This is done by first modeling the planetesimal evolution with the tree-based N-body code ChaNGa, and then passing the results to the hybrid-symplectic N-body code genga, once the particle count has dropped sufficiently. Previously, we showed that oligarchic growth fails to operate at arbitrarily short orbital periods. This leaves a distinct feature in the mass and orbital distribution of the planetary embryos. In this most recent work, we explore whether this boundary between oligarchic and non-oligarchic growth leaves any kind of imprint on the terrestrial planets that form. If so, this would provide an important clue to evaluate whether migration played a significant role in shaping the architecture systems of tightly-packed inner planets.