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Super-Earth formation in compact disks around M dwarfs

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M dwarfs are the most common stars in our solar neighborhood. Due to the improvements in radial velocity and transit techniques, we know that rocky planets, in particular close-in super-Earths, in compact configurations are the most common ones around M dwarfs. On the other hand, thanks to the high angular resolution of ALMA we know that most disks around very low mass stars are rather compact and small, which favors the idea of an efficient radial drift that could enhance planet formation in the terrestrial zone. Motivated by these results, we have investigated rocky planet formation around M dwarfs driven by pebble accretion through N-body simulations. We assumed that planet formation took place in compact dust disks caused by efficient dust radial drift. In the simulations we incorporated planet-disk interactions and tidal and relativistic corrections that include the evolution of the luminosity, radius and rotational period of the star. For our standard model we used different gas-disk viscosities and initial embryo distributions. For different stellar masses we also studied planet formation by planetesimal accretion. Our main result is that the sample of simulated planets that grow by pebble accretion in a gas-disk with low viscosity can reproduce the low-mass exoplanet population around M dwarfs in terms of multiplicity, masses and semi-major axis. Furthermore, we found that a gas disk with high viscosity can not reproduce the observed planet masses. Also, we show that planetesimal accretion favors the formation of water worlds and small planets that so far have not been detected. This work points towards a new approach for the disk conditions needed to study rocky planet formation around M dwarfs.