From planetesimals to planets by pebble accretion

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Small dust particles grow in protoplanetary discs to cm-size and start drifting inwards due to gas drag. Swarms of drifting pebbles can self-concentrate and form the first generation of planetesimals, through the streaming instability. These large planetesimals act as seeds that can efficiently sweep up more pebbles. We will discuss these various physical mechanisms in turn and show how together they may explain the formation of the cores of giant planets on wide orbits, within the gas disc lifetime.
Furthermore, we will show that the small body population, the comet source material, also shows an imprint of the pebble accretion process. By reproducing the size distribution of the bodies in the hot Kuiper belt, we argue the outer Solar System contained about 20 Earth masses of small bodies.