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Ceres and Vesta observed by Dawn Mission (Invited talk)

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Dawn was conceived to be a journey in space and time, to travel to extant surviving protoplanets and observe them to understand the early phases of solar system history. Dawn first examined Vesta, the largest, basaltic asteroid for which there are many terrestrial samples in the form of the HED meteorites. The geochemical community had decoded these samples and developed a model of radionuclide heating of the early protoplanets seeded by an early nearby supernova. Dawn's measurements were consistent with expectations based on the HED meteorites providing support for this model of early differentiation of planetesimals.

Dawn's second target is the dwarf planet Ceres, a body with no family of asteroids or associated meteorites. Its density suggests a significant water content, about 40%, consistent with formation a few million years later in solar system history, when the radionuclides had decayed and when little such heat would be trapped in its interior. According to Herschel Space Observatory Ceres has a water plume. Dawn began observing Ceres with resolved images in December 2014 and in late April 2015, the first comprehensive survey of the planet was done from a distance of 14,000 km. This will be followed by the survey orbit in June at a distance of 4900 km. We present the most important results at Vesta and an initial look at the Ceres' observations.

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