Rosetta, MIDAS and cometary dust: understanding the big picture from the smallest particles

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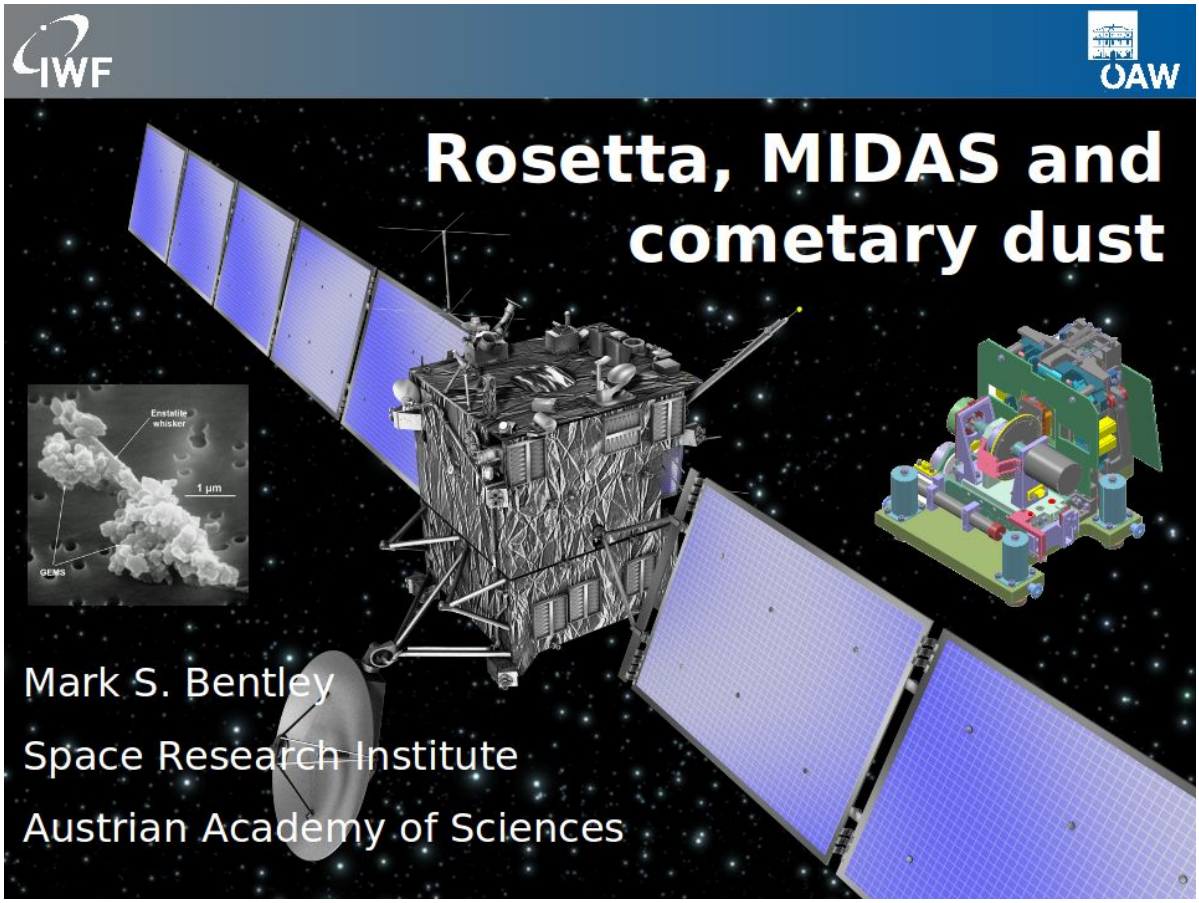
Rosetta, an ESA mission to study a comet, is one of the most challenging space missions ever carried out. After a 10 year cruise, the spacecraft will rendezvous with comet 67P/Churyumov-Gerasimenko, deploy a lander which will harpoon itself to the surface, and begin scientific study of the cometary nucleus. What makes Rosetta special is that (unlike a flyby) it will actually follow the comet during its passage through the Solar System and allow us to study when, why and how a comet becomes active.

As comets pass close to the Sun, heat penetrates their outer insulating shell (the dust mantle) and reaches the pristine material within, most likely an intimate mix of dust and ices. These ices then sublimate and produce gas which rapidly escapes the nucleus, dragging dust along with it, and forming the extended coma. It is these particles that scatter light and make the beautiful displays that are often visible from Earth. These particles also carry information about their formation history in the very earliest phases of Solar System evolution. Several instruments onboard Rosetta therefore aim to collect and analyse these dust particles, to determine their composition, shape, size and other properties. One of these instruments, MIDAS, is an atomic force microscope capable of making 3D images of collected dust with sub nanometre resolution.

This talk will provide an overview of the Rosetta mission and its instruments, and then focus on the MIDAS instrument and its scientific aims to better understand the big picture of Solar System formation by studying the smallest particles.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