



Melting probe prototype: new results

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Within the scope of an ESA contract, a study at the Space Research Institute in Graz concerning the design of a space worthy melting probe to study icy layers is in progress.

The main targets of interest for such a probe are the Mars polar caps and the icy moons of the outer planets like the Jovian satellite Europa. The permanent ice caps of Mars contain key information for the understanding of the recent climate history of the planet. A detailed investigation of Martian ice layers is also important for the understanding of the water exchange between surface and atmosphere. Jupiter's moon Europa is of special interest for exobiology, because there are strong indications for the existence of a subsurface water ocean, which may contain primitive forms of extraterrestrial life or precursor forms of life.

The usual devices to penetrate into ice which are already tested under terrestrial conditions are: drills, hammering devices (moles) and melting probes. These devices used at earth are heavy, need a lot of energy and are awkward to handle, opposed to that space melting probes should be small and very robust, have a much lower weight and should consume much less energy. Based on the knowledge obtained from terrestrial melting probes and tests with simple spherical shaped probes a first prototype able to work under space conditions was designed.

The mechanical and thermal design of the first prototype of the melting probe, results obtained from laboratory measurements and simulations as well as the next steps for a new design should be introduced.