



## On the location of acoustic sources on comet 67P/Churyumov-Gerasimenko

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The instrument CASSE onboard of Rosetta's lander unit Philae aims to record elastic waves of natural and artificial origin in the near-surface layers of comet 67P/Churyumov-Gerasimenko. The goal is to determine the elastic properties of the near-surface materials (elastic moduli, poisson's ratio, porosity). Considering natural sources like thermal cracking, the location of sources is an important step towards this.

We conducted source location experiments to determine wave propagation velocities and the location of hammer strokes over distances of up to six meters. We used triaxial piezo-electric accelerometers identical to those used on Philae. These were placed on the ground in the same geometry as will be used on the comet. Experiments took place on sandy soil on a fallow land in Berlin.

For source location, differential travel times of first arrivals were used, since P and S waves can hardly be distinguished on the short distances imposed by the Philae landing gear. A nonlinear least squares error measure was evaluated on a search grid in polar coordinates. The true source locations could be reconstructed in most cases. We intend to further improve the locations using wavefield polarization: A cross bearing location does not make assumptions on propagation velocity, thus enabling the determination of velocities from natural randomly distributed sources.