

THE COMET EXPERIMENT: FIRST RESULTS

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The french-soviet COMET experiment was designed to collect extraterrestrial material in earth orbit, on board the soviet Salyout-7 Space Station. The collectors consist of thin films covering gold or Ni modules. The collectors were maintained under vacuum within 4 individual boxes. The entire instrument has been installed on Salyout by the cosmonauts during an EVA in August 85.

The 4 boxes were opened for collection in October 85, during the encounter with the stream associated with the comet Giacobini-Zinner. One of the boxes remained open until the end of October, to allow grains from P/Halley to be also caught. The 4 boxes have been taken back from Salyout when the 2 cosmonauts occupying the new Station MIR left their Station to visit Salyout in May 86. They went back to MIR and finally returned to the Earth in July 86.

Back to the lab. at Orsay, the 4 boxes were still under vacuum. We opened them under ultraclean conditions, in a class 100 room specially designed for this experiment. All the collectors had survived, both those with 1000 Å thin Au self-supporting films and those with plastic foils. We then started optical studies of the collected material. Some of the collectors have been transferred back to Moscow for analysis.

For chemical analysis, the french team use a CAMECA IMS 300 ion analyser and a number of scanning electron microscopes (JEOL 840, Philips and Cambridge 200) equipped with X-rays detectors (Tracor and Link systems). We have detected different families of grains in the size range 0.1 - 5 µm. Space debris can be identified by their composition (Al or Ti-rich grains). Several types of grains have compositions compatible with an extraterrestrial origin. We shall present the most relevant of our preliminary results, obtained both in France and in USSR, and tentatively compare these results with those observed on stratospheric grains and during the fly-by of comet Halley, using impact ionization mass spectrometry (PIA-PUMA).