STARDUST INTERSTELLAR PRELIMINARY EXAMINATION – FIRST RESULTS A. J.Westphal[1], C. Allen[2], S. Bajt[27], R. Bastien[2], H. A. Bechtel[18], J. Borg[3], F. Brenker[4], J. Bridges[5], D. E. Brownlee[6], A. L. Butterworth[1], M. Burchell[21], M. Burghammer[22], B. Clark[26], G. Cody[13], C. Floss[7], G. Flynn[8], D. Frank[1], Z. Gainsforth[1], E. Grün[9], P. Hoppe[10], A. Kearsley[11], N. Kelley[1], H. Leroux[12], L. R. Nittler[13], R. Lettieri[1], B. Mendez[1], W. Marchant[1], S. A. Sandford[14], A. Simionovici[15], F. Stadermann[7], Z. Sternovsky[23], R. M. Stroud[16], S. Sutton[24], P. Tsou[17], A. Tsuchiyama[20], T. Tyliczszak[18], B. Vekemans[25], L. Vincze[25], J. Warren[2], M. E. Zolensky[2], >23,000 Stardust@home dusters[19] , [1]Space Sciences Laboratory, U. C. Berkeley. westphal@ssl.berkeley.edu [2]NASA Johnson Space Center. [3]IAS Orsay. [4]Universität Frankfurt am Main. [5]University of Leicester. [6]University of Washington. [7]Washington University, St. Louis. [8]SUNY Plattsburgh. [9]Max-Planck-Institut für Kernphysik. [10]Max-Planck-Institut für Chemie. [11]The Natural History Museum, London. [12]Université des Sciences et Technologies de Lille. [13]Carnegie Institution of Washington. [14]Ames Research Center. [15]Observatoire des Sciences de l'Univers de Grenoble. [16]Naval Research Laboratory. [17]Jet Propulsion Laboratory. [18]Advanced Light Source, LBNL. [19] Worldwide. [20]Osaka University. [21]University of Kent. [22]ESRF, Grenoble. [23] University of Colorado, Boulder. [24]Advanced Photon Source, ANL. [25]University of Ghent, Belgium. [26]Lockheed-Martin Corporation. [27]DESY.

The Stardust spacecraft exposed an aerogel and aluminum foil collector to the interstellar dust stream for a total of 195 days before its encounter with Comet P81/Wild2. We report the first results of the Stardust Interstellar Preliminary Examination. This is a formidable task because of the large collecting area (~1000 cm^2), the small expected statistics (a few dozen particles), the diminutive size of the captured particles (<1μm), the challenging nature of the collecting media, and the requirement that only minimally destructive techniques be used. We have close coupling between state of the art techniques and these challenging samples. The first analyses have been performed using aerogel keystones and picokeystones [1] extracted directly from the Stardust Interstellar Collector in order to preserve trajectory information. In the first analyses we have focused on contamination and beam damage assessment, and on the composition of high-angle tracks that we considered to be likely secondary ejecta from impacts of meteoroids on the spacecraft. These tracks were discovered by a consortium of >23,000 "citizen scientists" worldwide using the Stardust@home virtual microscope tools. We have confirmed this identification of secondary ejecta by the identification of Ce and Zn in these particles, but also detected evidence for extraterrestrial material from the original impactors in the form of Fe, Ni and Mg. FTIR and STXM analyses give quantitative upper limits on extraterrestrial organics, and have allowed for the quantitative evaluation of beam damage and carbon deposition during analyses. We have also identified alumina as a contaminant in the aerogel. No measurements have yet been made on the Al foil collectors.

[1] Westphal A. J. *et al.* 2004. *Met. Planet. Sci* 39: 1375