

EGU22-12123

<https://doi.org/10.5194/egusphere-egu22-12123>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Solar Orbiter SWA-PAS and SWA-HIS observations of O⁺ ions in the very distant tails of the comets C/2019 Y4(ATLAS) and C/2021 A1(Leonard)

Andrey Fedorov¹, Stefano Livi², Philippe Louarn¹, Chris Owen³, and Jim Raines⁴

¹IRAP UPS CNRS, Toulouse, France (andrei.fedorov@irap.omp.eu)

²Southwest Research Institute, San Antonio, TX, USA

³MSSL, University College London, UK

⁴University of Michigan, Ann Arbor, MI, USA

ESA solar observatory Solar Orbiter is expected to have flown close to a comet plasma tail two times during the mission cruise phase. It passed behind the comet C/2019 Y4(ATLAS) in the end of May 2020. The second chance occurred on December 2021 when Solar Orbiter has encountered the tail of C/2021 A1(Leonard). In the both cases the distance between the spacecraft and the comet nucleus was about 40 million km. At the time of the encounter the comet ATLAS was at just 0.3 AU from Sun, and in the second case the comet Leonard was at the Venus orbit (0.7 AU). In both cases SWA-PAS ion spectrometer has seen very clear signature of the pickup O⁺ ions (with the maximum at about solar wind velocity). We observed the flow of the cometary tail ions as rather sharp bursts on just several minutes of duration. The heavy ion mass-spectrometer HIS observed O⁺ ions (among other species of the cometary origin) during the Leonard's tail encounter. We used inter-calibrated data of both instruments to get the absolute O⁺ flux from both comets.