The first chemical content of a Kreutz sungrazer comet
The exceptional apparition of C/2026 A1

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Comets were formed during planet formation and later ejected beyond Pluto's orbit into the trans-Neptunian scattered disk (associated with the Kuiper Belt), or into the Oort Cloud. From these two reservoirs originate short-period comets (also called Jupiter-family comets), such as 67P/ Churyumov-Gerasimenko, and long-period comets, respectively [1].

Kreutz sungrazing comet are a very special type of comet, as they are characterised by extremely close passages to the Sun (heliocentric distance r_h < 0.01au), thus appearing extraordinarily bright due to the radiative outgassing. They are thought to be fragments of larger Oort cloud comets that either disintegrated under gravitational stress during a perihelion passage at very small r_h [2], or collided with a meteoric stream [3]. As fragments, sungrazers are relatively small, and their extreme declinations make them exceptionally difficult to observe from the ground. Consequently, very little is known about the origin and the chemical composition of these objects. Only three Kreutz sungrazers have been detected from the ground in the 21st century: C/2011 W3 (Lovejoy, the Great Comet of 2011), C/2024 S1 (ATLAS), and C/2026 A1 (MAPS).

Prior to this work, no spectroscopic studies have ever been performed on any of them, and so the chemical content of Kreutz sungrazers remained unknown. Observing these comets is not only challenging, but each opportunity might be unique, as each perihelion passage could be their last. Due to the extremely small r_h at perihelion, they may disintegrate under the intense tidal forces so close to the Sun, ultimately returning to dust.

C/2026 A1 sungrazer has been very recently discovered in January 2026 by A. Maury, F. Signoret, G. Attard with the MAPS survey. It is the sungrazing comet we detected at its largest heliocentric distance in history (r_h = 2.1 au). With an orbital period estimated at ~1800 years, the comet reached an exceptionally small perihelion distance of 0.005 au on April 4.60, 2026. Crucially, C/2026 A1 is the 1st Kreutz sungrazer to benefit from early JWST observations providing the 1st direct constraints on the nucleus of such an object [4]. Its radius is estimated to be 0.4-0.6 km, comparable to C/2011 W3. Unfortunately, C/2026 A1 did not survive its perihelion passage, and disintegrated on April 4th.

In this presentation, I will present the observations of the C/2026 A1 Kreutz sungrazer near perihelion, conducted from April 1st to April 3rd using the IRAM 30-m telescope. Through these observations, we monitored the comet's activity by tracking the emergence of the HCN(3-2) line over the three days. This study thus reports the first spectroscopic investigation of a Kreutz sungrazer comet, offering new insights into the understanding of these peculiar and rare objects.

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