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# Picoflares in the Solar corona observed by Solar Orbiter

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X-ray monitoring of the Sun inspired Eugen Parker's description of the elementary unit of energy release in the corona as nanoflare. He predicted the observation of even smaller events with more sensitive instruments of the 21st century. Until recently, it was impossible to confirm their existence in the corona. Moreover, the physical threshold for solar flares has been set at $10^{24}$ ergs (one nanoflare). On May 30, 2020, the Solar Orbiter High-Resolution EUV Imager, designed to minimize stray light and being half the distance to the Sun, recorded heating events with more minor space-time characteristics than nanoflares (left panel in Figure below). We estimated the thermal input of events from the derived increase of emission measure and temperature. We compared these events with the STIX X-Ray microflares recorded during the same period of Solar Orbiter's commissioning. We found that observed events emit thermal energy in the picoflare range of $10^{21}$ –$10^{24}$ ergs per event, lowering the limit of minimal known solar flares. Events demonstrate the same relationship between the physical characteristics of solar X-ray flares but at lower ranges (right panel in Figure below). They are GOES class flares, which are at least five times lower than A-class GOES flares. (1) Discovered with Solar Orbiter picoflares provide 3% of the additional, previously unobserved power of the total amount needed to heat the solar corona. (2) Their detailed morphology, observed at unprecedentedly small scales, is studied using stereoscopic methods.

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