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The Chasing All Transients Constellation Hunters — CATCH

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Modern astronomy has entered the multi-wavelength and multi-messenger era, and time-domain astronomy is one of the leading frontiers. Around 2030, a series of all-sky monitors and survey missions will discover more than tens of thousands of transients every day. However, the existing and planned telescopes can not simultaneously perform follow-up observations for so many transients of different sky regions, and many important scientific discoveries will be inevitably lost. Thus, we propose a new space science mission—Chasing All Transients Constellation Hunters (CATCH). CATCH is a constellation, which consists of hundreds of satellites. Each satellite will carry a lightweight focusing X-ray telescope developed by China independently. A single satellite can track one or several transients, and hundreds of satellites can work together to achieve uninterrupted monitoring of a substantial amount of transients. In addition, many satellites can also form a large field of view or a high-precision constellation to jointly chase some important targets (such as gravitational-wave bursts). CATCH has unprecedented scientific capabilities and will bring important scientific discoveries.

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