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Searching for the most dangerous near Earth asteroids in archival STEREO data

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ABSTRACT

IEOs (inner Earth objects or interior Earth objects) are potentially the most dangerous near Earth small body population. Their study is complicated by the fact the population spends all of its time inside the orbit of the Earth, giving ground-based telescopes a small window to observe them. We introduce STEREO (Solar TERrestrial Relations Observatory) and its 5 years of archival data as our best chance of studying the IEO population and discovering possible impactor threats to Earth.

We show that in our current search for IEOs in STEREO data we are capable of detecting and characterizing the orbits of 10-100 potentially dangerous IEOs. The number of expected detections by STEREO is based on the current number of known IEOs, which is heavily biased by the few objects discovered so far. STEREO is sensitive to IEOs that are not visible from the Earth and hence samples a part of the IEO population that has not been discovered yet.