Data Set Filtering for Microlensing-Effect Identification

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The effects of spacetime curvature, described in General Relativity, are made visible to us through gravitational lensing phenomena. Microlensing events (ML events) represent a type of gravitational lensing that can be mathematically described in a way that is comprehensible to high school students, without deriving the complex relativistic formulas. These events occur when the path of light from a n approximately point like source is influenced by a n a proximately point like lensing mass. If this lensing object moves precisely between the light source and an observer, it leads to an apparent and temporary amplification of light. To detect such an event, one must measure the brightness of a light source over time to spot variations. Given the rarity of ML events, a large dataset containing brightness values of numerous celestial sources is required. A dataset from the Samuel Oschin Telescope in California is made available by the Zwicky Transient Facility online, regularly updated, and currently holds over 6 terabytes of data. An efficient program was necessary to search such a huge dataset for potential microlensing light curves.

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