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Stellar Shocks From Dark Matter

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Macroscopic dark matter is almost unconstrained over a wide "asteroid-like" mass range, where it could scatter on baryonic matter with geometric cross section. We show that when such an object travels through a star, it produces shock waves which reach the stellar surface, leading to a distinctive transient optical, UV and X-ray emission. This signature can be searched for on a variety of stellar types and locations. In a dense globular cluster, such events occur far more often than flare backgrounds, and an existing UV telescope could probe orders of magnitude in dark matter mass in one week of dedicated observation.

Are you are a member of the APS Division of Particles and Fields?

Yes

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