

### Is the Gefion Dynamical Asteroid Family the Source of the L-Chondrites?

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**Introduction:** The ordinary chondrites (OC) comprise ~75% of the meteorite falls and have been dominant among falls for at least the past million years [1-3]. Each OC type appears to derive from a single parent body. Identification of the probable OC parent bodies has long been a priority of asteroid science. Based on dynamical and spectral criteria, asteroid (6) Hebe was been identified as probable parent body of the H-chondrites [4]. Among the OC falls, ~38% are L-chondrites. It seems probable that, like the H-chondrites, the parent body or family of the L-chondrites is located close to a main belt resonance that can efficiently deliver meteoroids into near Earth space.

Abundant fossil L-chondrites have been observed in Middle Ordovician sediments in various locations [5-7]. Shock features and <sup>40</sup>Ar-<sup>39</sup>Ar isochrons from many L-chondrites suggest a catastrophic breakup of the L-chondrite parent body ~480 Myr ago and a subsequent plethora of Middle Ordovician L-chondrite falls [8]. This constrains the age of the putative asteroid family L-chondrite source [5-7]. The Gefion family was selected as a plausible L-chondrite source due to its location adjacent to the 5:2 mean motion resonance, its age based on dynamical models, and the dominant S-type taxonomy of members [9-10]. Understanding the dynamical evolution of asteroid genetic families is important to the understanding of meteorite parent bodies. Thus the Gefion family was investigated as a possible source of the L-chondrites and to test the predictions of the dynamical models.

The VNIR spectra of 11 Gefion family members have been analyzed [13-14]. These spectra were obtained with the NASA IRTF 3 meter telescope on Mauna Kea. Data reduction and analysis are described in [4, 11-13]. These data indicate that most of the sampled Gefion Family members do not have L-chondrite compositions, instead comprising a diverse mix of lithologies. We conclude that the parent body (or family) of the L-chondrites must be sought elsewhere. Further we conclude that this failed dynamical prediction should be used to further refine the dynamical models which play such an important role in our understanding of the evolution of the solar system

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