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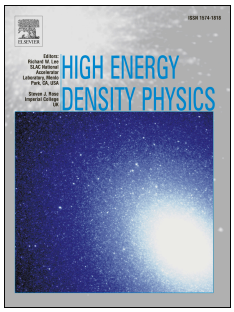

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THE USE OF EXTRAPOLATION CONCEPTS TO AUGMENT THE FREQUENCY SEPARATION TECHNIQUE

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Abstract

The Frequency Separation Technique(FST) is a general method formulated to improve the speed and/or accuracy of lineshape calculations, including strong overlapping collisions, as is the case for ion dynamics. It should be most useful when combined with ultrafast methods, that, however have significant difficulties when the impact regime is approached. These difficulties are addressed by the Frequency Separation Technique, in which the impact limit is correctly recovered. The present work examines the possibility of combining the Frequency Separation Technique with the addition of extrapolation to improve result and minimize errors resulting from the neglect of fast-slow coupling and thus obtain the exact result with a minimum of extra effort. To this end the adequacy of one such ultrafast method, the Frequency Fluctuation Method (FFM) for treating the nonimpact part is examined. It is found that although the FFM is unable to reproduce the nonimpact profile correctly, its coupling with the FST correctly reproduces the total profile.

Keywords: Stark broadening;

1. Introduction

The Frequency Separation Technique(FST)[1, 2] is based on three assumptions:

- a. We know how to compute impact broadening due to fast perturbers.
- b. We have a method that can treat slow perturbers, for example simulations[3, 4, 5, 6], the FFM[7], the MMM[8] or BID[9] and QC-FFM[10].