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Fluctuation Based Melting Criterion for Classical Few-Particle Systems DYLAN BUHR, University of Winnipeg, PATRICK LUDWIG, JENS BÖNING, TORBEN OTT, MICHAEL BONITZ, University Kiel — A common criterion for defining phase transitions in few-particle systems is the so called “Lindemann criterion,” which is based on changes of the “relative Interparticle Distance Fluctuations” (IDF). Recent research has revealed that in small systems, the Lindemann criterion will suggest different melting temperatures depending on how the associated IDF value is computed [1]. In previous Monte Carlo simulations we controlled this convergence issue by subdividing the simulation into fixed intervals and calculating the “Variance of the block averaged IDF” (VIDF) [2]. The advantages of VIDF as a fluctuation based quantity that constitutes a melting criterion is, (i) the universality of being applicable to various quantities in both classical and quantum systems, and (ii) VIDF is directly related to the physical processes taking place during a phase transition. In this contribution we extend the VIDF analysis to molecular dynamics simulations. [1] D.D. Frantz, *J. Chem. Phys.* **115**, 6136 (2001) [2] J. Böning et al., *Phys. Rev. Lett.* **100**, 113401 (2008)

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