Accepted Manuscript

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Abbas Khayyer, Hitoshi Gotoh, Yuma Shimizu, Kohji Gotoh

 PII:
 S0997-7546(16)30217-5

 DOI:
 http://dx.doi.org/10.1016/j.euromechflu.2017.01.014

 Reference:
 EJMFLU 3128

To appear in: European Journal of Mechanics B/Fluids

Received date: 24 May 2016 Revised date: 24 September 2016 Accepted date: 23 January 2017



Please cite this article as: A. Khayyer, H. Gotoh, Y. Shimizu, K. Gotoh, On enhancement of energy conservation properties of projection-based particle methods, *European Journal of Mechanics B/Fluids* (2017), http://dx.doi.org/10.1016/j.euromechflu.2017.01.014

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On Enhancement of Energy Conservation Properties of Projection-Based Particle Methods

Abbas Khayyer^{*}, Hitoshi Gotoh, Yuma Shimizu, Kohji Gotoh

Department of Civil and Earth Resources Engineering, Kyoto University,

Katsura Campus, Nishikyo-ku, Kyoto 615-8540, Japan

The paper investigates the energy conservation properties of two well-known projection-based particle methods, namely, MPS and ISPH methods. The enhancing effects of a set of refined schemes including Higher order Source term (HS), Higher order Laplacian (HL), Error Compensating Source (ECS), Dynamic Stabilizer (DS) and pressure Gradient Correction (GC) are shown through the simulations of a standing wave, oscillating drop and impacts of two fluid patches. The results highlight the superiority of corrected Taylor series consistent pressure gradient models for projection-based particle methods in providing accurate results with the best energy conservation as well as accurate reproductions of physical dissipations in fluid impact problems.

Keywords: Energy conservation, particle method, projection method, MPS, ISPH, physical dissipation

^{*} Corresponding Author, Tel: +81-75-383-3180, Email: khayyer@particle.kuciv.kyoto-u.ac.jp

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