EXPLOSIVE DISPERSSION O CONTINUMM AND GRANULAR MATERIALS

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Presentation preference: Oral

Key words: Fragmentation; Dispersion; Granular Material; Sub-Grid Modeling

Despite many years of research theoretical modeling of explosive dispersal of condensed matter [1] is still at odds with experimental results [2, 3]. Whereas, primary breakup of liquid metals (that are solid at room temperature) is fairly well described by Mott-Grady theories, this is not the case for the liquid state at room temperature. Furthermore, whereas secondary breakup of a single drop is fairly well understood [4,5], the collective behavior of "clouds" of drops or solid particles is still elusive [6,7]. The Latter is further limited by the lack of computer power which requires analytical solution on sub grid scales.
In this manuscript we consider various sub-grid scales related to explosive dispersal of continuum (liquids and solids) of particulate/granular matter (liquid and solid). Various sub-grid effects on numerical results are analyzed and contrasted with available numerical results in the literature.

[1] Gardner D. R., Near Field Dispersal Modeling For Liquid Fuel-air Explosives, SAND-90-0686, Albuquerque (1990).
[2] Milne, A., Longbottom, A., Frost, D.L., Loiseau, J., Goroshin, S., and Petel. O., Explosive fragmentation of liquids in Spherical Geometry, *Shock Waves,* **27**, 383-393, (2017).
[3] Pontalier, Q., Lhoumeauand, M., Frost, D.L., Non-Ideal Blast Waves from Particle Laden Explosives, *ISWW31,* **Nagoya**, (2017).
[4] Joseph, D.D, Belanger, J., and, Beavers, G.S., Breakup of a liquid drop suddenly exposed to a high-speed airstream, *Int. J. Multiphase Flow*, **25**, 1263-1303, (1999).
[5] Theofanous, T.G., Aerobreakup of Newtonian and Viscoelastic Liquids, *Ann. Rev. Flu. Mech.*, **43**,661-690 (2011).
[6] Loiseau, J., Pontalier, Q., Milne, A., Goroshin, S., and Frost, D.L., "Terminal Velocity of Liquids and Granular Material accelerated by Explosive", MABS-22, (2012).
[7] Frost, D.L., Goroshin, S., and F. Zhang, Jet Formation during explosive particles dispersal, MABS-22, (2012).