

MORPHOLOGY OF A POWDER JET AS A TARGET FOR THE NEUTRINO FACTORY

O. Caretta, C.J. Densham, P. Loveridge, STFC/RAL, Chilton, Didcot, Oxon;
T.W. Davies, Exeter University, Exeter, Devon;
R.M. Woods, Gericke LTd., Ashton-under-Lyne

Abstract

This paper proposes a technology based on fluidized powder which could be employed as a high power target (and beam dump), for example in a future Neutrino Factory or Muon Collider. A fluidized powder target is believed to bring together some advantages of both the solid and liquid phase whilst avoiding some of their drawbacks. The current Neutrino Factory and Muon Collider proposals require the use of a high Z target material withstanding beam ionisation heating of around 1 MW. The article proposes to use a dense tungsten powder jet as an alternative to the baseline open mercury jet for interaction with the proton beam inside the high field capture solenoid. The preliminary experimental results on the production and on the characteristics of a dense horizontal tungsten powder jet are presented. The morphology of the jet is analysed and presented as a function of the driving parameters (e.g. pneumatic supply pressure, boundary conditions of the jet, etc.). A test rig was developed to investigate the reliability of lean and dense phase pneumatic conveying of tungsten powder and the results of such experiments are discussed in the paper.

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