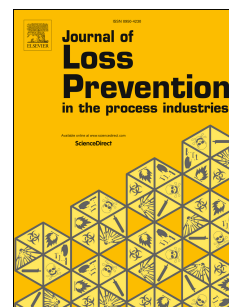


Accepted Manuscript

Investigation of dust dispersion in a modified Hartmann tube using positron emission particle tracking and simulations

Ann Elin Berg, Mari Gjerde Christiansen, Boris V. Balakin, Pawel Kosinski



PII: S0950-4230(18)30388-7

DOI: [10.1016/j.jlp.2018.06.007](https://doi.org/10.1016/j.jlp.2018.06.007)

Reference: JLPP 3718

To appear in: *Journal of Loss Prevention in the Process Industries*

Received Date: 19 April 2018

Revised Date: 13 June 2018

Accepted Date: 14 June 2018

Please cite this article as: Berg, A.E., Christiansen, M.G., Balakin, B.V., Kosinski, P., Investigation of dust dispersion in a modified Hartmann tube using positron emission particle tracking and simulations, *Journal of Loss Prevention in the Process Industries* (2018), doi: 10.1016/j.jlp.2018.06.007.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Investigation of dust dispersion in a modified Hartmann tube using positron emission particle tracking and simulations

Ann Elin Berg^a, Mari Gjerde Christiansen^a, Boris V. Balakin^{b,c}, Pawel Kosinski^{a,*}

^a*University of Bergen, Department of Physics and Technology, Norway*

^b*Western Norway University of Applied Sciences, Department of Mechanical and Marine Engineering, Bergen, Norway*

^c*NRNU Moscow Engineering Physics Institute, Department of Thermal Physics, Russia*

Abstract

An important research tool that is used for assessing fundamental dust explosion characteristics is the Hartmann apparatus, where dust is dispersed by a pressure wave. Nevertheless, it is questionable as to whether the formed dust cloud is uniformly dispersed as well as how the solid particles behave as they flow. In this study we used two research tools. The first one is the novel experimental technique Positron Emission Particle Tracking (PEPT). It derives from Positron Emission Tomography (PET) technique that is normally used in the medical environment. PEPT is a technique of tracking individual particles and can be used for studying multiphase flows. Thus the main objective of this paper is to demonstrate how this method can be used for studying such systems. The second tool we used in this research is numerical simulations in which the Eulerian-Lagrangian approach was adopted. Therefore the second main objective of the paper is to investigate the flow of a single particle in the Hartmann apparatus and show the complexity of the problem. According to the experimental results the process is highly stochastic and influenced not only

*corresponding author

Email address: pawel.kosinski@uib.no (Pawel Kosinski)

Download English Version:

<https://daneshyari.com/en/article/6972769>

Download Persian Version:

<https://daneshyari.com/article/6972769>

[Daneshyari.com](https://daneshyari.com)