

Abstract Submitted
for the CUWIP21 Meeting of
The American Physical Society

Silica aerogel as a particle filter in heavy ion detectors¹ CINCIA TSAI, Northwestern University — We investigate the use of high porosity silica (SiO_2) aerogel as a particle filter in heavy ion detectors to discriminate between electrons and positive ions. Our prototype device consists of silica aerogel grown in stainless steel micro-mesh that is designed to optimize electron transmission while absorbing positive ions. The samples are produced by the supercritical drying of alcogel (SiO_2 matrix suspended in methanol) imbibed in the micro-mesh, producing aerogel that fills the holes of the mesh. We then characterize the aerogel-filled mesh for homogeneity and electronic transparency using scanning electron and transmission electron microscopy (SEM and TEM). SEM analysis indicates that aerogel fills the mesh holes but is susceptible to damage resulting in partially unfilled mesh holes. TEM analysis indicates that electron transmission through aerogel-filled mesh holes is approximately half that of transmission through empty mesh holes. Moving forward, we will examine the effects of altering porosity and the amount of catalyst in the alcogel solution to improve the aerogel robustness and therefore its filling fraction and uniformity in the mesh.

¹National Science Foundation, DMR-1903053; Dr. William Halperin, Man Nguyen, and John Scott from Northwestern University; Dr. Yassid Ayyad Limonge from Michigan State University.

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Date submitted: 02 Jan 2021

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