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Reconstruction of Nearly Horizontal Muons in the HAWC Observatory ROBERT WAYNE SPRINGER, University of Utah, THE HAWC COLLABORATION COLLABORATION — A Hough transform algorithm is used to identify muons traversing the HAWC observatory by finding a line in the 3d point cloud of PMT hits (x_i,y_i, and ct_i). The arrival direction of the muon can be estimated from this line. Background Extensive Air Shower (EAS) fragments are identified by the presence of a lateral extension of PMT hits in a plane normal to the muon candidate trajectory. A geometry-based simulation has been developed to improve and estimate arrival direction reconstruction resolution and effective area. HAWC is surrounded by volcanoes that provide a variation of material depths from open sky to over 15 km of rock, thereby providing a means to measure muon flux as a function of material depth. A description of the reconstruction techniques and estimates of detector resolution, backgrounds, and effective area as a function of arrival direction, will be provided.

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