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Modeling the Effects of Mirror Misalignment in a Ring Imaging Cherenkov Detector¹ TAWANDA HITCHCOCK, AUSTIN HARTON, ED-MUNDO GARCIA-SOLIS, Chicago State University — The Very High Momentum Particle Identification Detector (VHMPID) detector is planned as an upgrade for the ALICE experiment at the LHC. This detector identifies charged hadrons in the range of 5 GeV/c to 25 GeV/c momentum range. The VHMPID uses a Ring Imaging Cherenkov (RICH) detector to determine the particle velocity. This is accomplished by focusing the Cherenkov radiation generated by a relativistic charged particle onto a photon detector using a 24 segment mirror and calculating from that image the Cherenkov angle. This velocity information coupled with the particle momentum allows the particle mass to be calculated. A major issue in the RICH detector is that changes in temperature, humidity and other environmental conditions can cause movements in mirror position leading to errors when determining the Cherenkov angle. In this poster we will model the effects of mirror misalignment using a commercially available optical modeling software package. This will include quantifying the effects of both rotational and translational mirror misalignment for the initial assembly of the module and later on particle identification.

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