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Modeling the Effects of Mirror Misalignment in a Ring Imaging Cherenkov Detector[1] TAWANDA HITCHCOCK, AUSTIN HARTON, EDMUNDO GARCIA, Chicago State University, VHMPID COLLABORATION — The Very High Momentum Particle Identification Detector (VHMPID) has been proposed for the ALICE experiment at the Large Hadron Collider (LHC). This detector upgrade is considered necessary to study jet-matter interaction at high energies. The VHMPID identifies charged hadrons in the 5 GeV/c to 25 GeV/c momentum range. The Cherenkov photons emitted in the VHMPID radiator are collected by spherical mirrors and focused onto a photo-detector plane forming a ring image. The radius of this ring is related to the Cherenkov angle, this information coupled with the particle momentum allows the particle identification. A major issue in the RICH detector is that environmental conditions can cause movements in mirror position. In addition, chromatic dispersion causes the refractive index to shift, altering the Cherenkov angle. We are modeling a twelve mirror RICH detector taking into account the effects of mirror misalignment and chromatic dispersion using a commercial optical 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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