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## Study of performance for particle identification at sPHENIX

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We will present our ongoing study of performance for particle identification at the sPHENIX project using a Geant4 simulation. The sPHENIX is the planned/anticipated upgrade of the PHENIX detector at RHIC. The physics programs of sPHENIX primarily aim at jets and heavy flavors. The program can be much enhanced with the preshower that provides separation of single photons from double photons from neutral pions up to 40 GeV/c and improved electron identification. A possible design of the preshower using a Geant4 simulation. The preshower detector is a very thin sampling calorimeter which is hence capable to observe electromagnetic showers at their initial development. First we calculate the lower limit of the opening angles of double photons from 40GeV/c neutral pions. Setting the cell size less than the lower limit allows us to identify the double photons, hence to separate high  $p_T$  single photons from high  $p_T$  neutral pions. Second, we try to improve the rejection power against charged pions to get a clean electron sample. The rejection power is found to reach the order of a thousand by properly choosing the cut parameters on the energy and shower shape in the preshower and the EM calorimeter in case of single particle. Further we have evaluated response in case of producing multiple particle using Hijing.

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