Contribution ID: **77** Type: **Oral**

Fast and Precise Luminosity Measurement at the ILC

Sunday, 12 March 2006 09:30 (20 minutes)

In the Very Forward Region of the detectors for the International Linear Collider two subsystems will be situated: LumiCal and BeamCal. These detectors cover a polar angle range from 82 mrad down to a 4 mrad. LumiCal and BeamCal give the possibility of the detection of single high energetic particles in their coverage region. Despite this a precise measurement of the total luminosity will be done using the LumiCal. This detector is optimized to achieve a relative error on the luminosity of 10E-4 by measuring bhabha events. Studies on the physics background in this region are presented and on systematic uncertainties introduced by displacement, beam-beam effects and the geometries for different crossing angles. The BeamCal is used to obtain a fast luminosity signal by measuring the deposited energy from pairs originating from beamstrahlung. Furthermore analysing the shape of the deposited energy grants access to the parameters of the colliding beams. These measurements can be used to tune the beams and maximize the achievable luminosity. The analysis of the energy depositions for different geometries and a realistic detector simulation are presented which show encoruaging results.

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Session Classification: Machine Detector Interface

Track Classification: Machine Detector Interface