Contribution ID: **338** Type: **Parallel Talk**

Quark production in high energy electron positron collisions: from strange to top

Friday, 8 July 2022 17:30 (15 minutes)

The process ee->qq with qq=ss,cc,bb,tt plays a central role in the physics programs of high energy electron-positron colliders operating from the O(100GeV) to O(1TeV) center of mass energies. Furthermore, polarised beams as available at the International Linear Collider (ILC) are an essential input for the complete measurement of the helicity amplitudes that govern the production cross section. Quarks, specially the heaviers, are likely messengers to new physics and at the same time they are ideal benchmark processes for detector optimisation. All four processes call for superb primary and secondary vertex measurements, a high tracking efficiency to correctly measure the vertex charge and excellent hadron identification capabilities. Strange, charm and bottom production are already available below the ttbar threshold. We will show with detailed detector simulations of the International Large Detector (ILD) that production rate and the forward backward asymmetries of the the different processes can be measured at the 0.1% - 0.5% level and how systematic errors can be controlled to reach this level of accuracy. The importance of operating at different center of mass energies and the discovery potential in terms of Randall-Sundrum models with warped extra dimensions will be outlined.

In-person participation

Yes

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Session Classification: Top quark and EW Physics

Track Classification: Top quark and EW Physics