CERN-BINP workshop for young scientists in e+e- colliders



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Beam tuning simulation for ATF2 low beta* optics

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The nanometer beam size in the interaction point (IP) is required for future linear colliders in order to achieve the required rate of particle collisions. The goal of the ultra-low β_* study is to lower the IP vertical beam size by lowering the βy^* value. The experimental part of this project is being performed in KEK Accelerator Test Facility (ATF2) where the beamline design and conditions are analogous to the Beam Delivery System (BDS) of the future linear colliders.

Stronger beam focusing makes the beam more sensitive

to any imperfections like e.g. magnetic multipole fields and

fringe fields. It also causes the second and third order optical

aberrations to become more pronounced and more difficult

to correct. Using the computer simulations we identify the

most important aberrations and develop the mitigation methods, e.g. tuning knobs and use of the octupole magnets.

The tuning simulations are compared with experimental results from ATF2.

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