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Track based alignment of the ATLAS inner detector

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It is foreseen that the Large Hadron Collider will start its operations and collide proton beams during November 2007. ATLAS is one of the four LHC experiments currently under preparation. The alignment of the ATLAS tracking system is one of the challenges that the experiment must solve in order to achieve its physics goals. The tracking system comprises two silicon technologies: pixel and microstrip plus a transition radiation detector. The alignment of the system requires a the determination of more than 36000 degrees of freedom. The precision required for the most sensitive coordinate of the devices is of the order of few microns. This precision should be attained with a track based alignment and from the application of complex alignment algorithms. They require an extensive CPU and memory usage as large matrix inversion and many iterations algorithms are used. The alignment algorithms have been already exercised on several challenges as a Combined Test Beam, Cosmic Ray runs (at the surface and in the pit) and large scale computing simulation of physics samples. This note reports on the methods, their computing requirements and its preliminary results.

Submitted on behalf of Collaboration (ex, BaBar, ATLAS)

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