
DRF: Thesis SL-DRF-19-0266

RESEARCH FIELD

Particle physics / Corpuscular physics and outer space

TITLE

Towards a high spatial resolution pixel detector for particle identification: new detectors contribution to physics

ABSTRACT

Future experiments on linear colliders (e+e-) with low hadronic background require improvements in the spatial resolution of pixel vertex detectors to the micron range, in order to determine precisely the primary and secondary vertices for particles with a high transverse momentum. This kind of detector is set closest to the interaction point. This will provide the opportunity to make precision lifetime measurements of short-lived charged particles. We need to develop pixels arrays with a pixel dimension below the micron squared. The proposed technologies (DOTPIX: Quantum Dot Pixels) should give a significant advance in particle tracking and vertexing. Although the principle of these new devices has been already been studied in IRFU (see reference), this doctoral work should focus on the study of real devices which should then be fabricated using nanotechnologies in collaboration with other Institutes. This should require the use of simulation codes and the fabrication of test structures. Applications outside basics physics are X ray imaging and optimum resolution sensors for visible light holographic cameras.

LOCATION

Institut de recherche sur les lois fondamentales de l'univers
Département d'Electronique, des Détecteurs et d'Informatique pour la physique
DÉtecteurs: PHYsique et Simulation
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