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**SSC Detector Subsystem R&D Proposal to Develop
Track and Vertex Detector Based on Silicon Drift Devices.**

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ABSTRACT

We propose to develop a vertex and an inner tracking detector for the SSC based on Semiconductor Drift (Memory) Detectors. We believe that silicon drift detectors are ideal detector elements to be used for the charged particle tracking close to the interaction region of the SSC for the following reasons:

1. the unambiguous position resolution of only several μm in two perpendicular directions
2. attribution of hits belonging to different bunch crossings with a timing accuracy better than $1ns$ and
3. the intrinsic signal pipeline within the very volume of the silicon drift detector.

The inner tracking detector extends radially at most to about $50cm$ from the beam axis. We assume larger gas detectors follow behind the inner tracking detector. Only the inner tracking detector and the vertex detector are the topics of this proposal.

1. Introduction

We propose to develop a high resolution charged particle tracking and vertexing subsystem to solve the challenge of particle tracking at small distances from an interaction region at the SSC. The system is based on silicon drift detectors - relatively new but well tested devices. We propose the following steps leading to the development of the complete system:

1. To design silicon drift detectors "matched" to the SSC environment, that is, particle rates and a very likely presence of a strong magnetic field around an intersection region. The silicon drift detectors must have a drift speed calibration system to eliminate the need for a precise monitoring of the detector temperature.

Mask and production material		50 k
BNL	1 Full time mechanical engineer	80 k
	1 Full time electrical engineer	80 k
	2 Full time technicians (2 × 50 k)	100 k
	Equipment and material	60 k
	Travel	20 k
	TOTAL	340 k
Harvard	1 Full time electrical engineer	80 k
	1 Student	27 k
	Equipment	30 k
	Travel	10 k
	TOTAL	147 k
Princeton	1 Full time mechanical engineer	80 k
	1 Student	27 k
	Equipment	20 k
	Travel	8 k
	TOTAL	135 k
Pittsburgh	1 Full time electrical engineer	80 k
	1 Student	25 k
	Equipment and material	20 k
	Travel	10 k
	TOTAL	135 k
Rockefeller	1 Half time technician	25 k
	Equipment and Material	10 k
	Travel	3 k
	TOTAL	38 k
	GRAND TOTAL	845 k