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Performance of the STAR Heavy Flavor Silicon Tracker in Measuring the Charged B Meson through $B \rightarrow J/\Psi + X$ Decay ELIZABETH BROST, Grinnell College / Purdue University REU program — The STAR detector, located at the Relativistic Heavy Ion Collider at Brookhaven National Laboratory, gathers data from particle collisions. STAR's main task is to study the properties of the matter produced in these collisions, particularly the quark-gluon plasma (QGP), which is expected to have been created a few microseconds after the “Big Bang”. Among all probes used to study the properties of the QGP, heavy quarks are unique, and ideal for studying the QGP because of their large mass. One particularly interesting way to study heavy quarks is through the $B \rightarrow (J/\Psi \rightarrow e^+ + e^-) + X$ decay channel, since there is very little background. Using simulated central Au+Au collision data containing electron-positron pairs from $B \rightarrow J/\Psi$ decay and from prompt J/Ψ decay, I was able to reconstruct the displaced vertices (L_{xy}) for the J/Ψ particles. Then, I made a distribution of L_{xy} for B decay (signal) and prompt (background) J/Ψ particles. Finally, after making successive cuts of L_{xy} , I created signal-to-background and efficiency distributions for measuring the charged B mesons in central Au+Au collisions through this decay channel.

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