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# Axonal Transport with Attachment and Detachment to Parallel Microtubule Network

Abhishek Choudhary Mr.

*Rensselaer Polytechnic Institute*, [abhi.achoudhary@gmail.com](mailto:abhi.achoudhary@gmail.com)

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## **Axonal Transport with Attachment and Detachment to Parallel Microtubule Network**

Abstract: We present a mathematical framework to analyze the intracellular transport inside an axon. Our model captures the spatial dynamics and interactions of motor and cargo through a system of coupled stochastic differential equations. Using the techniques of asymptotic analysis, the first passage time for the reattachment of a tethered motor is computed. Through the application of renewal-reward theory we are able to derive the key quantities of interest for the transport processes spanning over multiple attached and detached phases of a single molecular motor and cargo complex.