



Department of
Theoretical Physics

THE QUANTUM SPACETIME SEMINAR SERIES

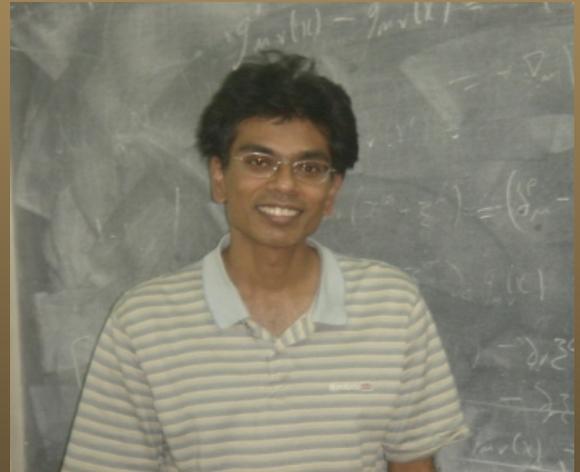
Constraints on parity violating conformal field theories in $d=3$

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We derive constraints on three-point functions involving the stress tensor, T , and a conserved $U(1)$ current, j , in 2+1 dimensional conformal field theories that violate parity, using conformal collider bounds introduced by Hofman and Maldacena. Conformal invariance allows parity-odd tensor-structures for the $\langle TTT \rangle$ and $\langle jjT \rangle$ correlation functions which are unique to three space-time dimensions. Let the parameters which determine the $\langle TTT \rangle$ correlation function be \mathbf{t}_4 and \mathbf{a}_T , where \mathbf{a}_T is the parity-violating contribution. Similarly let the parameters which determine $\langle jjT \rangle$ correlation function be \mathbf{a}_2 , and \mathbf{a}_j , where \mathbf{a}_j is the parity-violating contribution. We show that the parameters $(\mathbf{t}_4, \mathbf{a}_T)$ and $(\mathbf{a}_2, \mathbf{a}_j)$ are bounded to lie inside a disc at the origin of the $\mathbf{t}_4 - \mathbf{a}_T$ plane and the $\mathbf{a}_2 - \mathbf{a}_j$ plane respectively. We then show that large N Chern-Simons theories coupled to a fundamental fermion/boson lie on the circle which bounds these discs. The 't Hooft coupling determines the location of these theories on the boundary circles.