



The Abdus Salam
**International Centre
for Theoretical Physics**



**Conference on Frontiers of Nanoscience
24 August - 1 September 2015, Trieste, Italy**

Hall Effect through the Superconductor-(Metal) Insulator Transition in Two-Dimensions

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Abstract:

In the present work we focus on SIT which is in the limit of strong disorder. We supplement the “standard” magnetoresistance measurements with Hall effect data which contains some striking effects. Using the QHIT to SIT mapping, we draw further insight into the phases on both sides of the transition. In particular we argue that on the insulating side of the SIT the system behaves like a “Hall insulator,” a phase first discussed by Kivelson *et al.* in terms of the global phase diagram for the quantum Hall effect. Similar Hall effect results were first published by Paalanen *et al.*, and our analysis below applies to their data as well.