

CEA - Saclay 91191 Gif-sur-yvette Cedex  
**Service de Physique de l'Etat Condensé**  
**SÉMINAIRE**

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**Mercredi 7 avril 11h15**

**Orme des Merisiers SPEC Salle Itzykson, Bât.774**

**THE THEORY OF THE "0.7 ANOMALY" IN QUANTUM POINT CONTACTS**

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A quantum point contact (QPC), a narrow region separating two wider electron reservoirs, is the standard building block of sub-micron devices. As a function of its width, the conductance through a QPC changes in integer steps of  $G_0 = 2e^2/h$ , signaling the quantization of its transverse modes. Such measurements also reveal an additional shoulder at a value around  $0.7G_0$ , an observation which remains a puzzle even after a couple of decades. The phenomenology of this "0.7 anomaly" in quantum point contacts is fully explained in terms of a quasi-localized state, which forms as the point contact opens up. Detailed numerical calculations within spin-density functional theory indeed confirm the emergence of such a state. Quantitative calculations of the conductance and the noise are obtained using a model based on these observations, and are in excellent agreement with existing experimental observations.

The seminar will be given in English. A coffee break will be served at 11h00.

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