



McMaster University



University of Toronto



University of Waterloo

## THE FIELDS INSTITUTE FOR RESEARCH IN MATHEMATICAL SCIENCES

### DIRECTOR'S SEMINAR

**SPEAKER:**

**RENATE LOLL**  
Syracuse University

On the Topic:

### "The Loop Approach to Non-Abelian Gauge Theory and Gravity"

In this talk I will review recent progress in establishing a manifestly gauge-invariant reformulation of Yang-Mills theory and gravity (in the Ashtekar formulation). The basic variables in this formulation are the traces of holonomies around closed curves in a space(-time) manifold. I describe what is known about the equivalence between this formulation and the usual one in terms of local connection one-forms. The most rigorous results about this equivalence have been obtained in a regularized (lattice) version of the theory. One main motivation for investigating the loop approach is the possibility that it may allow for a non-perturbative quantization of these non-linear field theories. The use of non-local loop variables raises a number of conceptual and technical problems in both physics and mathematics, which so far have been resolved only partially.

**Monday, April 26, 1993**

**4:00 pm, room 3018**

**at**

**The Fields Institute**

**Refreshments 3:00 pm, Common Room**

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