

# Open Talk

5<sup>th</sup> March, 2019

4:00 PM

Fermion

SPEAKER

**Professor N. D. Hari Dass**

TIFR-TCIS Hyderabad

TITLE OF THE TALK

**'Gauge Symmetry' is an oxymoron, and 'Spontaneous breaking of gauge symmetry' is a double oxymoron**

ABSTRACT

There is a profound difference between invariance (say, of the action) under gauge transformations, and say, under rotations. The latter, also invariances, are true symmetries while the former are just invariances. They actually lack the important hallmarks of symmetries like degeneracies and conservation laws. Consequently, the phrase 'gauge symmetry' is an oxymoron even though many leading experts use this phrase. Since there is no symmetry, there can not be any spontaneous breaking of gauge symmetry, making that phrase a double oxymoron.

I will present a thorough technical and conceptual analysis of the relevant issues. I will discuss the importance of Noether's second theorem (most have only heard of one!) in this context. My talk is a tribute to Emmy Noether in this centenary year of the publication of her theorems.

HOST FACULTY

**Professor Manu Mathur**

Department of Theoretical Sciences

**S. N. Bose National Centre for Basic Sciences**