

STARS2013 - 2nd Caribbean Symposium on Cosmology, Gravitation, Nuclear  
and Astroparticle Physics / SMFNS2013 - 3rd International Symposium on  
Strong Electromagnetic Fields and Neutron Stars



Contribution ID: 13

Type: **Talk**

## Weighed scalar averaging over inhomogeneous cosmological models

*Saturday, 4 May 2013 16:45 (30 minutes)*

Averaging the fully tensorial Einstein equations and their solutions (spacetimes) is an open problem in General Relativity. I present and discuss the proper 3-volume scalar averaging formalism endowed with a non-trivial weight factor, and its application to inhomogeneous cosmologies (LTB and Szekeres models). This formalism leads to a fully determined system of evolution equations for the averaged covariant scalars and their fluctuations and perturbations, allowing for a deeper coordinate independent theoretical understanding of the deviation from FLRW homogeneity, either in terms of a rigorous formalism of exact perturbations over an FLRW abstract background, or through a definition of gravitational entropy in a phase space made by weighed averages of the density and Hubble scalar velocity. I discuss how this weighed scalar averaging can be applied to more general geometries and to various theoretically relevant issues in GR.

**Primary author:** SUSSMAN, Roberto (Instituto de Ciencias Nucleares, Universidad Nacional Autónoma de México (ICN-UNAM), Mexico D.F., Mexico)

**Presenter:** SUSSMAN, Roberto (Instituto de Ciencias Nucleares, Universidad Nacional Autónoma de México (ICN-UNAM), Mexico D.F., Mexico)

**Track Classification:** STARS2013