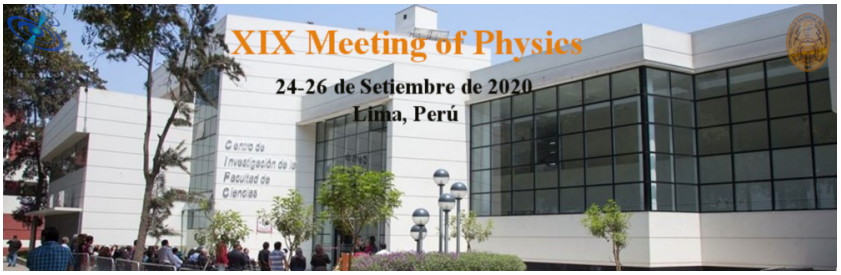

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Integral form of Yang-Mills equations and its gauge invariant conserved charges

Thursday, 24 September 2020 11:00 (30)

Despite the fact that the integral form of the equations of classical electrodynamics is well known, the same is not true for non-abelian gauge theories. In this talk we present the integral form of the classical Yang-Mills equations in the presence of sources and then use it to solve the long standing problem of constructing non-abelian electric and magnetic conserved charges, for any field configuration, which are invariant under general gauge transformations. The construction is based on concepts in loop spaces and on a generalization of the non-abelian Stokes theorem for two-form connections, which resemble the techniques used in integrable field theories. The charges are explicitly evaluated

for monopoles and dyons. In the case of the Wu-Yang monopole the integral equations imply that such a solution needs a unique point source to be self-consistent. Our results
are important in the understanding of global properties of non-abelian gauge theories.

1. L. A. Ferreira and G. Luchini, "Integral form of Yang-Mills equations and its gauge invariant conserved charges," Phys. Rev. D 86 (2012), 085039; doi:10.1103/PhysRevD.86.085039; [arXiv:1205.2088 [hep-th]]
2. L. A. Ferreira and G. Luchini, "Gauge and Integrable Theories in Loop Spaces," Nucl. Phys. B 858 (2012), 336-365; doi:10.1016/j.nuclphysb.2012.01.005; [arXiv:1109.2606 [hep-th]].

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Session Classification : keynote talks