Parity Violation in Elastic Electron-Nucleon Scattering: Strangeness Content in the Nucleon

R. González-Jiménez[1], **J.A. Caballero**[1], **T. W. Donnelly**[2]

[1]Departamento de Física Atómica, Molecular y Nuclear, Universidad de Sevilla, Aptdo 1065, E-41080 Sevilla, Spain

[2]Center for Theoretical Physics, Laboratory for Nuclear Science and Department of Physics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, USA

Traditional contituent quark models based only on up (u) and down (d) flavours have provided for years successful descriptions of some measured static properties of the nucleons. However, the existence of the quark-antiquark sea in the nucleon, and in particular, the role played by the heavier strange pairs, has been firmly established in deep inelastic lepton scattering (DIS) experiments as well as in pion-nucleon scattering processes. Although the existence of the quark sea is well established, how the nucleon strangeness enters in the electromagnetic nucleon properties remains as an open question with significant contributions in the last years from the theoretical and experimental points of view.

Parity violation in elastic electron-nucleon scattering is studied in our work. Basic goal is to improve the knowledge of the electroweak hadronic structure with special emphasis on the strangeness content in the nucleon. Results for the parity-violating (PV) asymmetry are provided and compared with a large variety of data measured at very different kinematics. The effects introduced in the PV asymmetry due to different descriptions of the hadronic structure are analyzed in detail. A wide selection of prescriptions to deal with the electromagnetic and weak nucleon form factors, including the most recent ones used in the literature, is considered. The analysis is done within the framework of the one-boson-exchange approximation.