The geometrization of gravity has become one of the cornerstones of modern science having an impact on the industrial progress connected to many activities of daily life. In fact, in the last decades substantial research has been invested into post-Newtonian corrections for high-precision space geodesy and navigation [1-4], as well as into the design of analogue models of gravity by making use of advanced optical and acoustic metamaterials (see e.g. [5-7]). Other present industrial procedures requiring very accurate timing show the need of innovative development of computationally efficient space-time models for use in space. In particular, these models become important in geolocation of passive radiotransmitters in space and to improve active space debris removal [8-10]. Moreover, acoustic metamaterials—artificially produced materials with exceptional properties not found in nature—provide the engineer with tools to fabricate acoustic devices with highly unusual features. However, the mathematical modelling of acoustic phenomena with curved background spacetimes not only poses challenges in engineering, but may also raise fundamental questions beyond their possible verification in the laboratory environment. This minisymposium is continuation of the ECMI 2014 Minisymposium “Spacetime Models of Gravity in Space Geolocation and Acoustics”, so that it is dedicated to the last three topics just mentioned. The session starts with a contribution aimed to determine velocities and emission frequencies of passive radiotransmitters in space by FDOA. The work is in line with previous works carried out at the University Carlos III of Madrid [11-13] with the collaboration of the Instituto de Matemática Multidisciplinar of the Universitat Politècnica de València. The speaker and title of the talk are

Javier Clares. Universidad Carlos III de Madrid (Spain). FDOA determination of velocities and emission frequencies of passive radiotransmitters in space.

The following contributions form the last step in a series of recent works [14,15]. This series is aimed to help increase the accuracy of the space based APT systems endowed with very narrow laser beams e.g. for active space debris removal. In particular, the second contribution shows the results of several experiments obtained by numerically solving the equations of the first contribution, and is the result of a cooperation between Gregorio Millan Institute from the University Carlos III of Madrid and the Institute for Analysis and Scientific Computing from Vienna University of Technology, and the third, between Gregorio Millan Institute and personnel of ALTEN. The speaker and title of the first talk are

Jose M. Gambi. Universidad Carlos III de Madrid (Spain). Non-linear post-Newtonian equations for the motion of designated targets with respect to space based APT laser systems.

The speaker and title of the second talk are

Maria L. García del Pino. Universidad Carlos III de Madrid (Spain). Post-Newtonian corrections to the Newtonian predictions for the motion of designated targets with respect to space based APT laser systems.

The final contribution is dedicated to the emerging field of transformation acoustic. Here, in particular the focus is on modelling acoustic wave propagation in 2D spaces of constant curvature with the help of a variational principle. The contribution on this topic is led by the Universitat Politècnica de València [16-18], and so far, one previous work includes the cooperation of members of the Institute for Analysis and Scientific Computing from Vienna University of Technology [19]. The speaker and title of the talk are

Javier Clares. Universidad Carlos III de Madrid (Spain). FDOA determination of velocities and emission frequencies of passive radiotransmitters in space.

Keywords: APT laser systems, Acoustic metamaterials, transformation acoustics, Geolocation, post-Newtonian relative orbital motions, NoSQL.

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