

**Short description of the proposed project work  
and Curriculum Vitae  
Daniel Hernández Ruipérez**

**Aim of the visit:** work jointly with C. Bartocci and U. Bruzzo on the book “Fourier-Mukai and Nahm transform in geometry and mathematical physics” to be published by Birkhäuser Verlag.

**Short description:** Since the appearance of the Penrose transform in the early 70’s and the classification of instantons on Euclidean space by Atiyah, Hitchin, Drinfeld and Manin a few years afterwards, integral transforms have taken a prominent position in Mathematics and Physics. Other main examples are the Nahm transform for instantons on the four-torus, and the Fourier-Mukai transforms for coherent sheaves on abelian varieties and other varieties. The important role of such constructions was later solidified by its applications to the study of vector bundles on projective varieties, to the equivalence of derived categories of coherent sheaves, and to gauge and string theory.

The plan of the book is to review all the basic constructions and definitions, making comparisons among them and considering their applications. The book also aims to enable the reader to understand the more advanced, recent literature on the topic.

The proposed activity is a meeting of the authors of the book to finish the preparation of the manuscript, including discussion of different viewpoints on some topics, alternative proofs, organisation of the material and writing of the introductory sections of various chapters. This kind of work is done more efficiently by the three authors together, thus taking advantage of direct contact and interchange of ideas.