



CRETE CENTER FOR
QUANTUM COMPLEXITY
AND NANOTECHNOLOGY

ΣΕΜΙΝΑΡΙΟ ΚΕΝΤΡΟΥ ΚΒΑΝΤΙΚΗΣ ΠΟΛΥΠΛΟΚΟΤΗΤΑΣ &
ΝΑΝΟΤΕΧΝΟΛΟΓΙΑΣ/ CCQCN SEMINAR

Tuesday, 22 March 2016

11:00-12:00

3rd Floor Seminar Room

From Dirac cones to flat bands and optical pseudo-spin angular momentum

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Abstract

Two dimensional periodic lattices, such as graphene, may host conical intersections in their energy-momentum spectrum, the Dirac cones, with electron spin replaced by a half-integer fermionic pseudospin. The ability to engineer lattices in photonics and metamaterials opens up many novel possibilities of qualitatively different singular dispersion relations. Examples include the formation of higher order conical intersections with integer or “bosonic” pseudospin and macroscopically degenerate flat spectral bands. Their origin is rooted in local symmetries of the lattice, with destructive interference leading to the existence of compact localized eigenstates. We discuss recent theoretical and experimental results in photonic flat-band lattices, from conical diffraction with integer pseudospin, generation of optical vortices and orbital angular momentum, to the effects of flat bands in systems with disorder, such as modification of Anderson localization.

