Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Emergent Weyl excitations in systems of polar particles SERGEY SYZRANOV, MICHAEL WALL, BIHUI ZHU, VICTOR GURARIE, ANA MARIA REY, JILA and Physics Department, Univ of Colorado - Boulder — Systems with Weyl quasiparticle dispersion have been predicted to display a plethora of novel fascinating phenomena: chiral anomaly, topologically protected Fermi arcs on the surfaces, non-Anderson disorder-driven transitions, etc. Over the last several years enormous research efforts have been directed at finding new Weyl semimetals in solid-state systems and ways to realise them in ultracold atomic gases. We demonstrate that excitations with Weyl dispersion generically exist in three-dimensional systems of polar particles in the presence of magnetic field. They emerge due to the dipolar-interaction-induced transitions between the $J = 0$ and $J = 1$ angular-momentum states of the particles. Also, we calculate the quasiparticle spectra microscopically for systems of alkaline-earth atoms that can be realised experimentally and suggest a Ramsey-spectroscopy protocol for observing Weyl excitations in them.

Sergey Syzranov
Univ of Colorado - Boulder

Date submitted: 28 Jan 2016

Electronic form version 1.4