Organic-inorganic metal halide hybrids have recently emerged as a highly promising class of functional materials with excellent optical and electronic properties for a variety of applications, including solar cells, light emitting diodes, photodetectors, and lasers. The exceptional structural tunability enables these materials to possess three- (3D), two- (2D), one- (1D), and zero-dimensional (0D) structures at the molecular level. Remarkable progress has been realized in this research area in recent years, focusing mainly on 3D and 2D structures, but leaving low dimensional 1D and 0D structures significantly underexplored. In this talk, I will discuss our recent work in low dimensional organic-inorganic metal halide hybrids with 1D and 0D structures. Due to the strong quantum confinement and site isolation, bulk assemblies of 1D and 0D organic-inorganic metal halide hybrids exhibit remarkable and unique properties that are significantly different from those of well-known 3D and 2D metal halide perovskites. For instance, broadband white emissions have been achieved in single crystalline bulk assemblies of 1D organic-inorganic metal halide nanowires and nanotubes; and near-unity photoluminescence quantum efficiency has been realized for a number of 0D organic-inorganic metal halide hybrids. The excitement about the recent developments of organic-inorganic metal halide hybrids with controlled dimensionalities lies not only in the specific achievements, but also in what these materials represent in terms of a new paradigm in materials design. There is a vast parameter space to explore organic-inorganic metal halide hybrids beyond perovskites, and we expect to encounter a lot of new science in the coming years.

CBC SEMINAR ANNOUNCEMENT

Professor Biwu Ma
Florida State University

Organic-Inorganic Metal Halide Hybrids Beyond Perovskites

Date: 5th November 2018 (Monday)
Time: 2:00pm – 3:30pm
Venue: SPMS Research & Graduate Studies Office Conference Room
Host: Professor Robin Chi