

Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Quantum Spin Liquid in Herbertsmithite MIRON AMUSIA, Racah Institute of physics, Hebrew University, Jerusalem, Israel and Ioffe Institute, St. Petersburg, Russia, VASILY SHAGINYAN, 2Petersburg Nuclear Physics Institute, NRC Kurchatov Institute, Gatchina, Russia — We present a theory of herbertsmithite as a quantum spin liquid (QSL) made of chargeless fermionic spinons [1]. The essence of our theory is the notion of so-called fermion condensation quantum phase transition. Main manifestation of it is unlimited increase of the quasiparticles effective mass. We analyze the dynamic magnetic susceptibility of QSL compounds, and show that spinons form a continuum, and populate an approximately flat band crossing the Fermi level. Transport properties of QSL compounds shed light on their nature. We demonstrate that the thermal transport exhibits a scaling behavior, resembling that of heavy-fermion compounds, and reveal a strong magnetic field dependence of the effective mass. We propose the arrangement of the thermal transport measurements in magnetic field that could probe the low-lying elementary excitations, testing itinerant spinons excitations in Herbertsmithite. 1. M.Ya. Amusia, K.G. Popov, V.R. Shaginyan, and V. A. Stephanowich, *Theory of Heavy-Fermion Compounds*, Springer Series in Solid-State Sciences **182**, (2014). .

Miron Amusia
Racah Institute of physics, Hebrew University, Jerusalem and Ioffe Institute, St. Petersburg

Date submitted: 01 Mar 2016

Electronic form version 1.4