

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

A possible mechanisms for quantum coherence assisted ion transport in ion channels ALIPASHA VAZIRI, Max F. Perutz Laboratories (MFPL), University of Vienna, Austria and the Research Institute of Molecular Pathology (IMP) — Recently it was demonstrated that long-lived quantum coherence exists during excitation energy transport in photosynthesis. It is a valid question up to which length, time and mass scales quantum coherence may extend, how to one may detect this coherence and what if any role it plays for the dynamics of the system. Ion-channels are involved in many physiological processes. In the nervous system their coordinated opening and closing generates action potentials that form the basis for intra-neural communication which are essential for information representation and processing. We have recently suggested that the selectivity filter of ion channels may exhibit quantum coherence which might be relevant for the process of ion selectivity and conduction. I will discuss some of our current experimental efforts in this direction and show that quantum resonances could provide a viable approach to probe these quantum coherences. The emergence of resonances in the conduction of ion channels that are modulated periodically by time varying external fields can serve as signatures of quantum coherence in such a system.

Alipasha Vaziri
Max F. Perutz Laboratories (MFPL), University of Vienna, Austria and
the Research Institute of Molecular Pathology (IMP)

Date submitted: 28 Dec 2010

Electronic form version 1.4