**Questions and answers - Jure Zupan Lecture 2**

The following questions were submitted through Zoom Q&A. Some / all may have been answered in the Q&A session already. Nevertheless, we request our lecturers to provide written answers here for the benefit of those who could not attend that session. Thank you!

(1) Experiments searching for mu -> e + photon are background limited. For example the accidental overlap of e from one muon, and photon from another muon - improved resolution helps but getting harder. Can we do the inverse experiment: e + photon -> mu instead? E.g. given the tremendous improvements in photon beams from XFELs in recent years.

**A:** You are correct, the mu->e gamma search at MEGII is limited by accidental backgrounds. The energy resolution helps in reducing those, and this is what the MEGIII proposal is trying to achieve, by redesigning the experiment, using photon conversion to e+e- pairs. The e+gamma-> mu search sounds to me challenging, since the effective scales that one needs to probe are very high, at the 10^6 GeV level. However, one could gain, if both electron and photon energies are high (the cross section should scale as sigma \propto E^2/Lambda^4). I am not aware of studies that looked into this in detail (though this does not mean there are none), but maybe it is worth looking into

(2) P32, is it possible to have a diagram that higgs get a vev entering the mu -> e gamma fermion line?

**A:** The flavor violating couplings of the Higgs come from dimension 6 operators of the form \bar f_i f_j H^3, where two of the Higgses obtain a vev. So yes, secretly the flavor violating vertices in the diagrams on p. 32 of the talk contain two insertions of the Higgs vev.

(3) In backup slide, you mentioned that mu - > 3 e and mu -> e gamma can be related if dipole contributions dominate. In this scenario, which limit is the currently more stringent one?

**A:** Currently the most stringent are bounds from mu->e gamma from MEG-II. In the future, however, all three types of experiments are going to be similarly sensitive. This is

visually depicted on p. 25 of the second lecture, where the three vertices of the green triangle are roughly the same distance from the center.