## An exercise based on visual identification of strange particles; a proposal by ALICE for the Masterclasses

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- Abstract. The European Masterclasses, organised by EPPOG (the European Particle Physics Outreach Group) since 2005, have been using LEP data (mainly Z0 and W decays). Now that the LHC is up and running, EPPOG intends to include exercises based on data from LHC collisions to the Masterclasses. The ALICE experiment, designed to study heavy ion collisions, is developing an exercise based on the visual *identification of strange particles.*
- One of the goals of ALICE is the search for quark gluon plasma (QGP), a state of matter that existed for a brief fraction of a second after the Big Bang; this is expected to be reproduced at the extreme temperatures and densities resulting from collisions of lead ions at the LHC. One of the signatures for the creation of this primordial state of matter, the QGP, is strangeness enhancement; thus the exercise will give the opportunity for an introduction to heavy ion physics and the experimental signatures.
- The proposed exercise will consist of a search for V0-decays of strange baryons, such as  $K^{o}s \rightarrow \pi + \pi$ -,  $\Lambda \rightarrow p + \pi$ - and cascades, such as  $\Xi \rightarrow \Lambda + \pi$ - (  $\Lambda \rightarrow p + \pi$ -). The proposed tool is an implementation of the visual V0 and cascade finder, used by the standard ALICE event display programme (ALIEVE), in the root framework; in this way it can easily be ported to any computer without requiring the installation of the whole ALICE software. The identification of the strange particles will be based on the topology of the decay combined with the identification of the decay products; in addition the information from the tracks will be used to calculate the invariant mass, as an extra confirmation of the particle species. Thus the pupils will be introduced to the concept of invariant mass. This will be complemented by a discussion on particle identification methods and techniques, which is one of the strong points of ALICE.