Aging Studies for the Transition Radiation Tracker of ATLAS

(title assigned)

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Studies of aging effects carried out in the framework of the ATLAS Transition Radiation Tracker (TRT) collaboration are presented. Aging effects such as damage to wire gold, cathode material degradation, Si-polymerization, and possible processes leading to these effects are discussed in detail. Some recommendations and remedies are presented.

Summary of Talk:

1. The main agent responsible for the gold-damage effect is H_2O. To avoid this effect the H_2O concentration must be below 1000 ppm. In this case, no damage to the gold is observed up to 20 C/cm of accumulated charge.
2. The most complicated problem is Si-polymerization. There are many external sources of Si; a careful choice of components and cleaning of components is necessary.
3. If the gas system components contain small traces of Si, they can be removed by flushing with dimethylether (DME).
4. Straws can be easily polluted by Si which then stays in the straws for a long time and can produce aging effects at a later time under certain conditions.
5. The straw material itself contains Si which under certain conditions polymerizes on the wire. It can be removed by special cleaning procedures.
6. Active radicals produced in avalanches react with the detector material but no aging effect is observed if this material does not contain Si.