Triggering on leptons and photons on ATLAS

**ATLAS Experiment**

**Run 1:** $\sqrt{s} = 7-8$ TeV
**Run 2:** $\sqrt{s} = 13$ TeV

**Motivation**
- Search for new physics like SUSY or Extra Dimensions
- Precise measurement of Standard Model including Higgs boson

**Detector**
- Inner Tracker
- EM & Hadronic Calorimeter
- Muon Detector

**Trigger system**
- Hardware based L1 trigger
- Software based High Level Trigger (HLT)

**Triggering on Muons**
- RPC and TGC have rapid response
  - Used for L1
- MDT and CSC have high resolution
  - Used for HLT

**L1**
- 2 station coincidence for lower $p_T$ threshold
- 3 station coincidence for higher $p_T$ threshold
- Coincidence of Inner TGC and Middle TGC is required
  - Fake muons mainly from beam pipe are reduced with negligible efficiency loss

**HLT requirements for Electron**
- Requirement for matching between tracks and clusters
- Some fast algorithms are skipped and keeping sufficiently low trigger rates and thresholds
- Better trigger efficiency

**HLT requirements for Photon**
- No requirement for matching between tracks and clusters
- Faster and more precise online reconstruction

**Conclusion**
- Lepton and Photon triggers on ATLAS have high performance, keeping sufficiently low trigger rates and thresholds