A large area muon telescope detector (MTD) at mid-rapidity will provide excellent muon identification and trigger capabilities at mid-rapidity in the high-luminosity era at RHIC. This novel and compact detector can provide crucial measurements for many exciting physics perspectives. We can measure and separate different Upsilon states and measure $J/\psi$ over a broad transverse momentum range through di-muon decays to study color screening features. The measurement of $e$-muon correlations can distinguish heavy flavor contributions from initial lepton pair production. The construction of the MTD at STAR is in progress. In 2012, about 10% of the full system has been installed in STAR and data were taken smoothly. In this poster, we report on the performance of the MTD including its trigger capabilities and spatial resolution from Run-12.

**Motivation**
- di-muon pairs from QGP thermal radiation, quarkonia, light vector mesons, hadrons, and Drell-Yan production
- single muons from the semi-leptonic decays of heavy flavor hadrons
- advantages over electrons: no $\gamma$ conversion, much less Dalitz decay contribution, less affected by radiative losses in the detector material
- excellent mass resolution, separate different upsilon states
- trigger capability for low to high $p_T$ $J/\psi$ in central Au+Au collisions
- distinguish heavy flavor decayed lepton pairs from initial lepton pair production

**Summary:**
- 10% of full system was installed in STAR for Run-12 and took data.
- MTD trigger system worked well with the STAR trigger system.
- Intrinsic resolution based on cosmic-ray data: 2.6 cm along the strip and 1.9 cm perpendicular to the strip.
- Time resolution will be obtained from Run-12 cosmic-ray data.
- More than half the full system will be installed for Run-13.

**MDT trigger capabilities**
- coincidence with 2 TOF sectors, trigger for cosmic-ray events
- MTD&VPD (vertex position detector) trigger: coincidence with minbias trigger, trigger for MTD&VPD minbias events
- MTD&BHT (calorimeter high tower) trigger: coincidence with hits on energy deposition in EMC, trigger for events with $e-\mu$
- MTD 2hits trigger: require at least two hits on MTD, trigger for events with $\mu-\mu$

**MTD efficiency for cosmic-ray with different thresholds**

**MDT&VPD TAC difference for MTD&VPD trigger (pp500GeV)**

**Event display**
- $e-\mu$ event
- $\mu-\mu$ event

**Cosmic trigger**
- $\sigma$ of 10% (13 modules) of the full system installed in STAR for Run
- $\sigma$ of 10% (13 modules) of the full system installed in STAR for Run
- $\sigma$ of 10% (13 modules) of the full system installed in STAR for Run
- $\sigma$ of 10% (13 modules) of the full system installed in STAR for Run

**Track projection steps**

**Track projected position**

**Cosmic trigger**
- $\sigma$ of 10% (13 modules) of the full system installed in STAR for Run
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**Performance of the Muon Telescope Detector (MTD)**

**in STAR at RHIC**

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The STAR Collaboration: http://drupal.star.bnl.gov/STAR/presentations