

# Low Energy RHIC electron Cooling (LEReC)

RHIC Time Meeting  
January 14, 2020

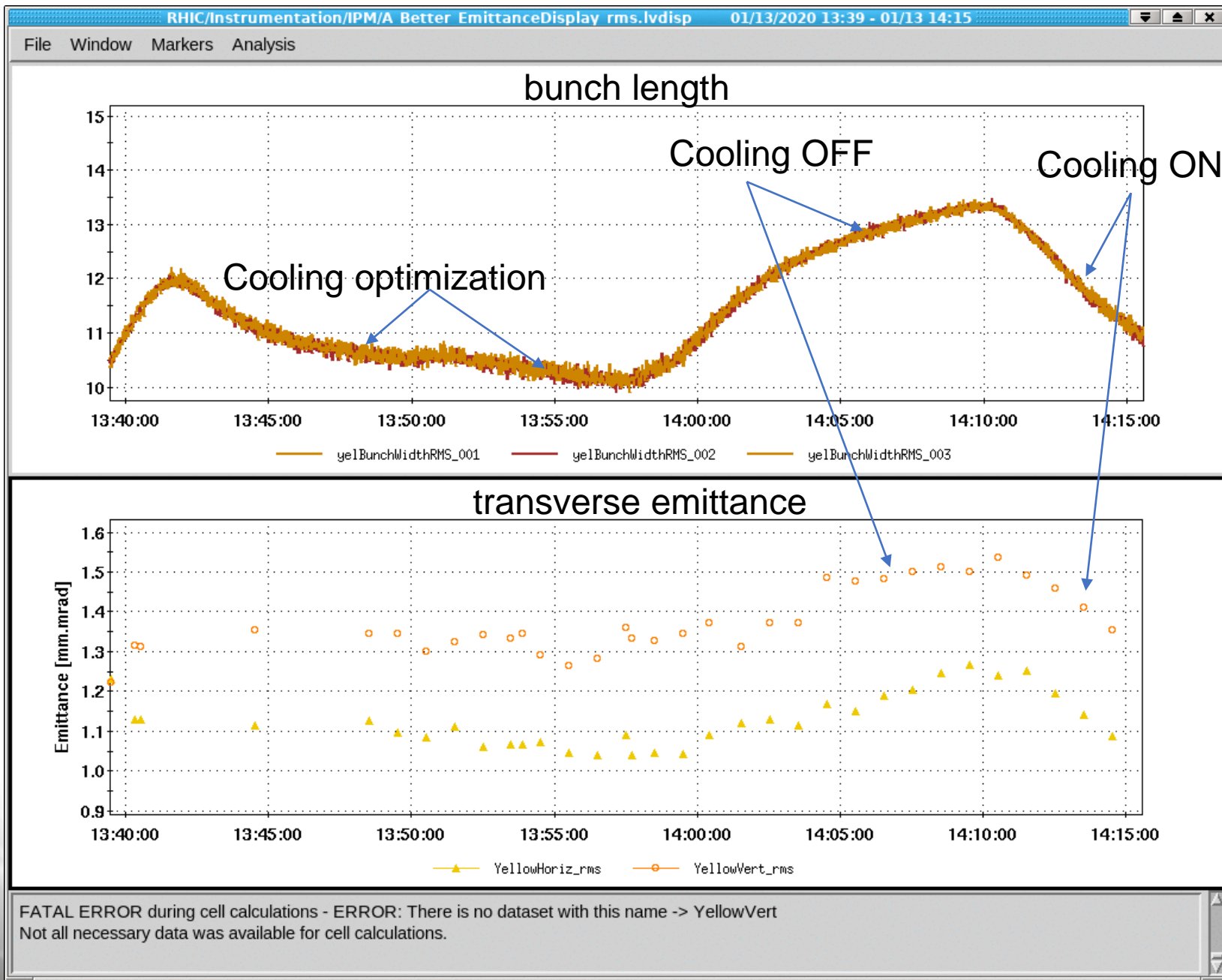
**BROOKHAVEN**  
NATIONAL LABORATORY

 U.S. DEPARTMENT OF  
**ENERGY**

# LEReC progress/updates for January 7-13

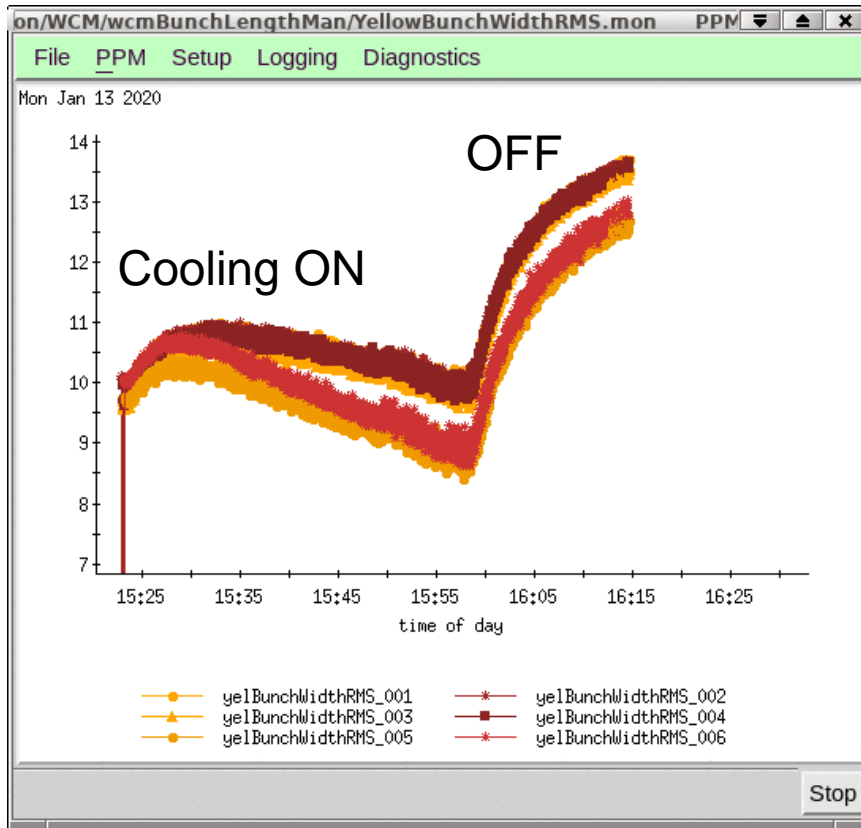
- Finished BPMs testing (channel switching from BPMs buttons) and calibration
- Optimized optics for cooling in Yellow and Blue
- Cooling/heating studies
- Started cooling optimization
- **Were not able to start studies and optimization for new RF Timing system since it was not ready due to technical issues.**

# Cooling optimization

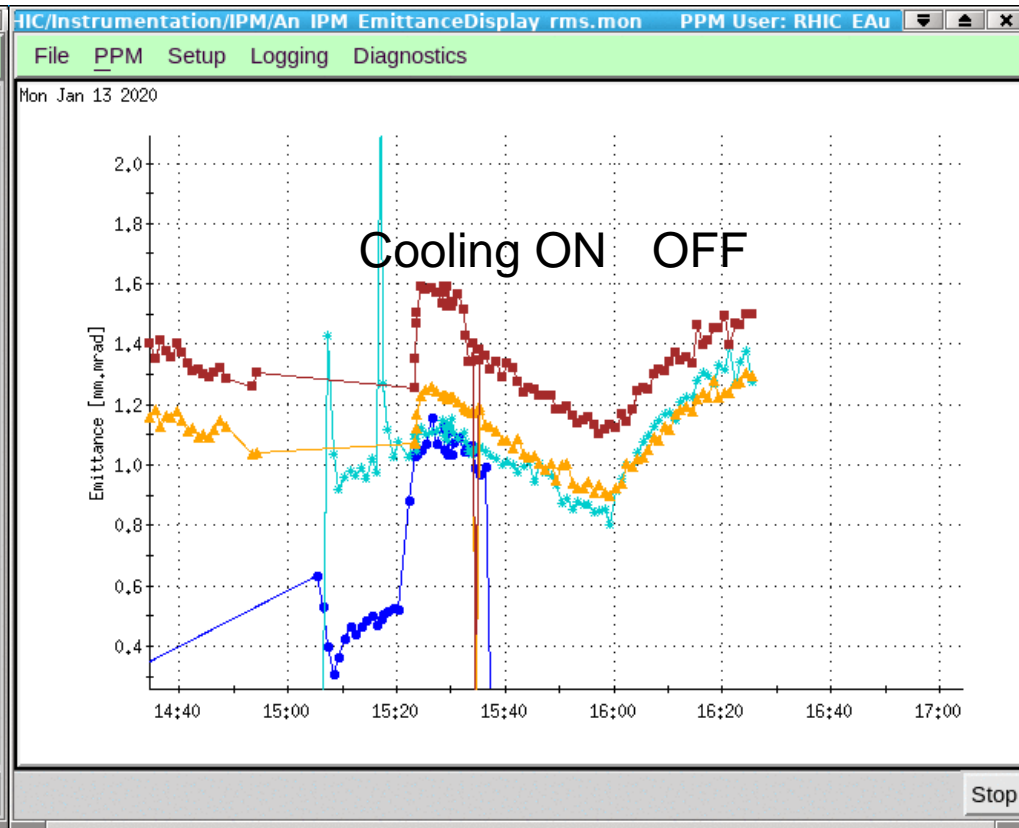


# Simultaneous cooling in Yellow and Blue using CW e-beam

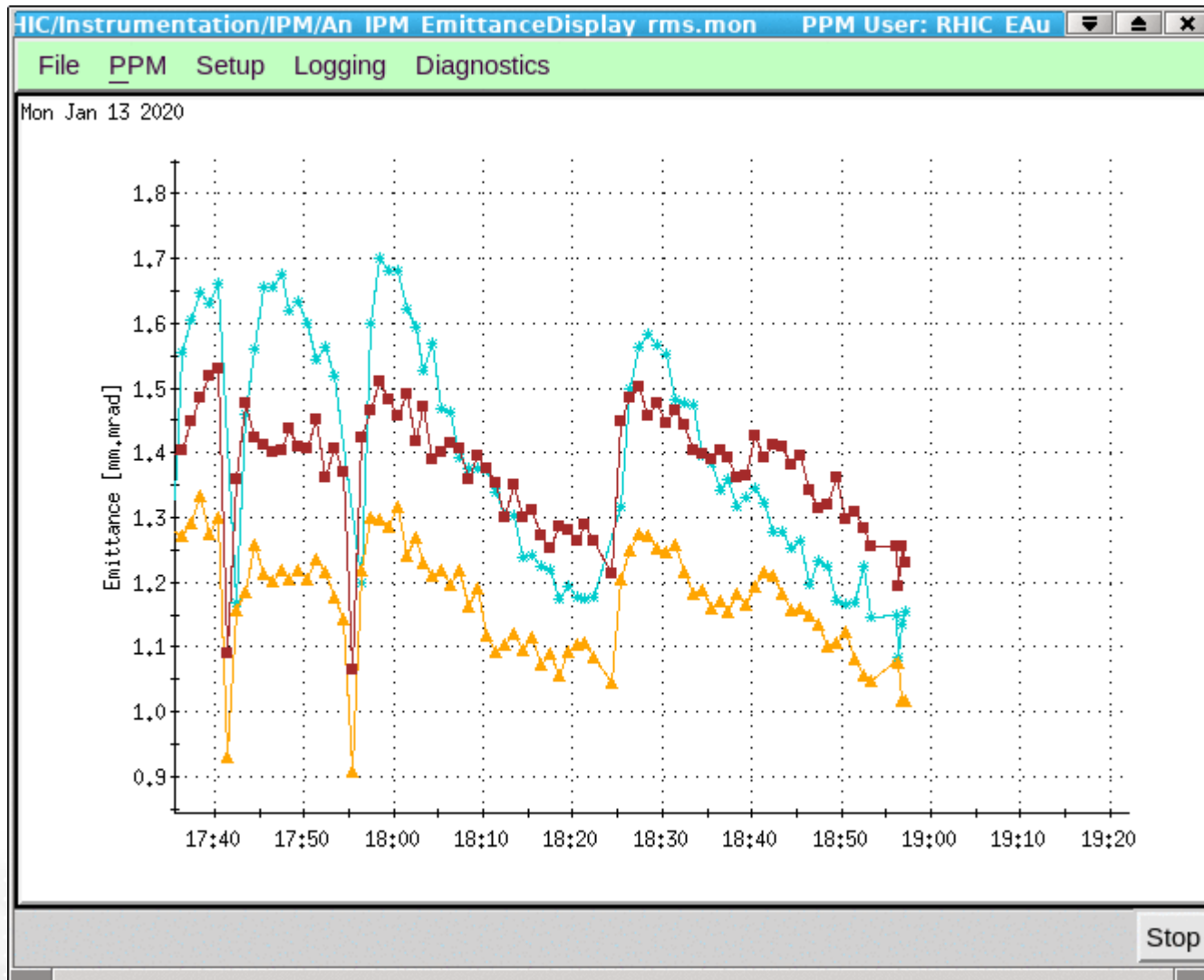
## Bunch length



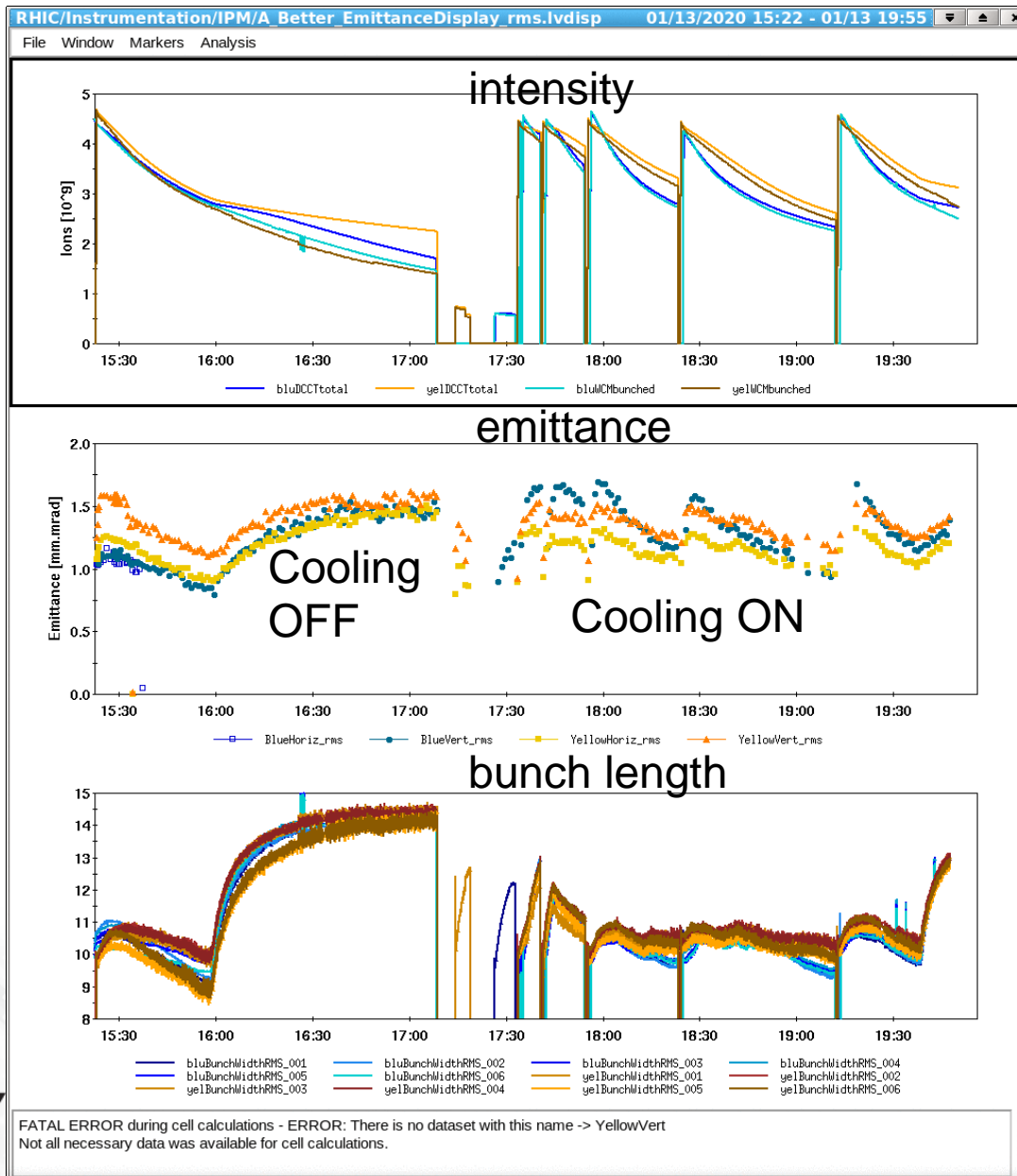
## Transverse emittance



# Transverse cooling



# Cooling optimization



FATAL ERROR during cell calculations - ERROR: There is no dataset with this name -> YellowVert  
 Not all necessary data was available for cell calculations.

# LEReC status and plans

- Developed several e-beam optics
- Optimizing 3D cooling
- Cooling vs heating optimization

## Plans:

- **Delayed due to technical issues:** Start testing of cooling effectiveness with new RHIC timing (different 9MHz RF harmonic due to combined use of 9 and 28MHz RF this year), which results in significant shift of electron MB with respect to ion bunch. Will probably take few shifts to test various regimes and come up with compatibility conclusions.
- Work on ion lifetime improvement
- Work on transverse cooling optimization
- Luminosity improvement optimization (need first establish good setups with new RF Timing, then can start optimization with detectors ON)