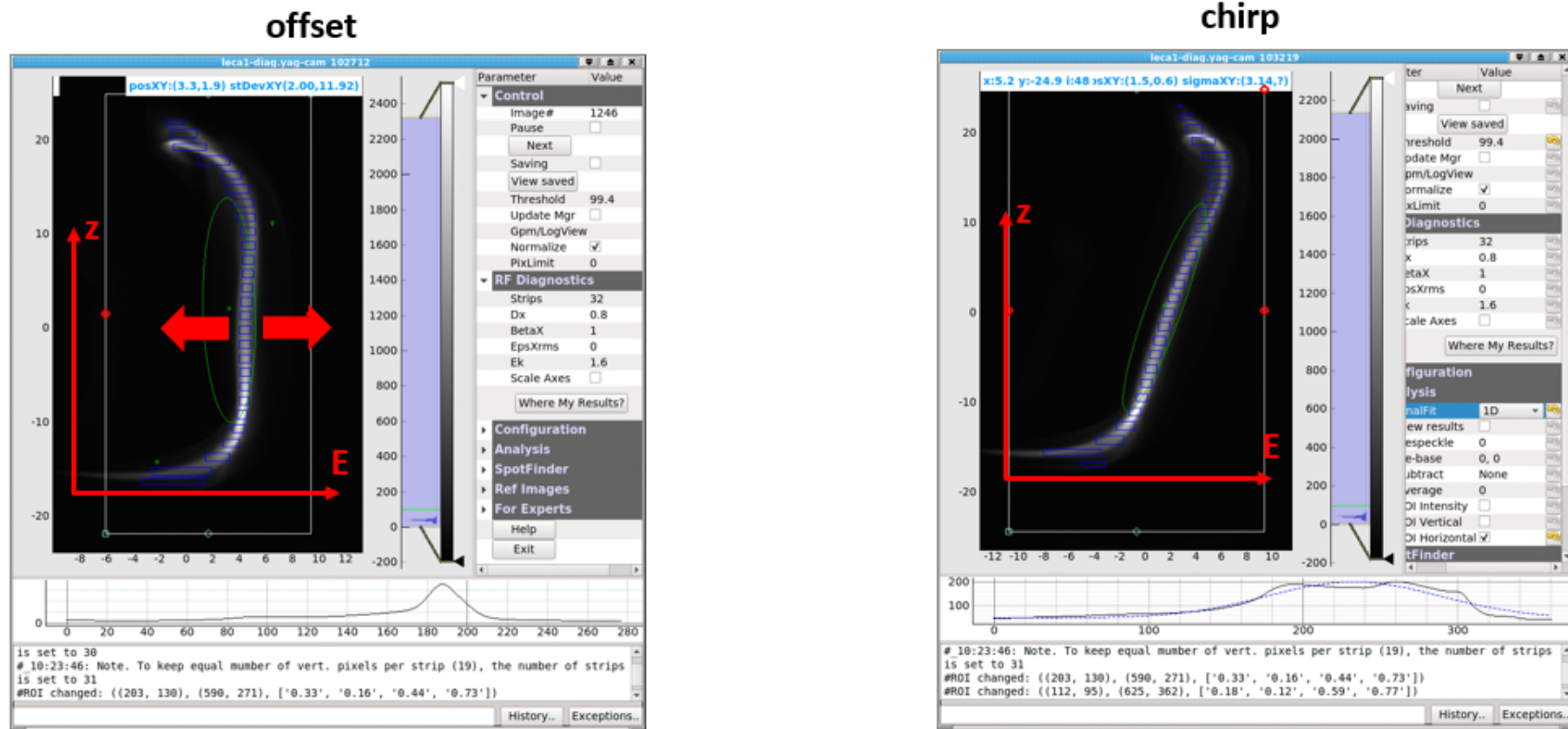


# Results from electron-ion heating experiment: Sergei

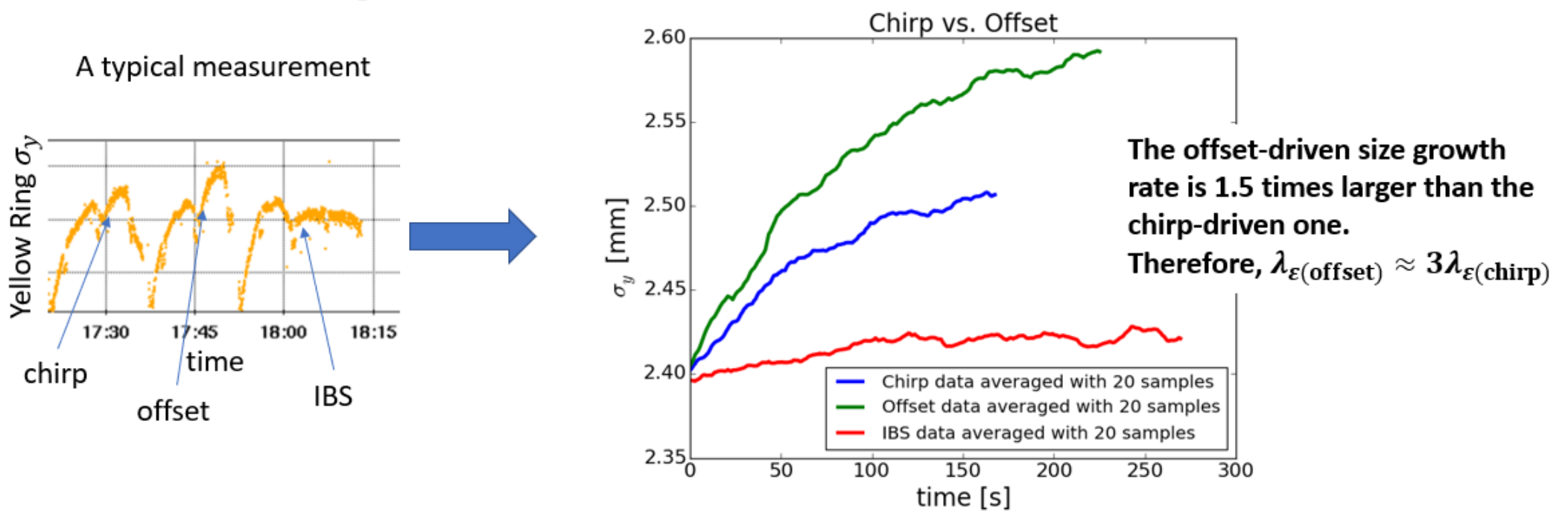
## Studies objective

- We wanted to test a theory that the heating is a result of the energy offset leading to creation of the longitudinal attractor and the coupling of the transverse & the longitudinal phase spaces via the ions D' in the cooling section. This would explain the linear rate-density dependence.
- To test this idea, we need to compare the heating due to the E-offset to the heating in the presence of the E-chirp.



## Measurements

- We need three measurements to test the theory: a heating due to an offset, a heating due to a chirp, the IBS-driven size growth.
- Without the 9 MHz RF the lifetime at  $\gamma = 4.1$  is poor even for the low intensity ion bunches.
- It turned out that the best way to do the measurements is to precool the ions to the same conditions (size, length, intensity) and then “switch off” the cooling and measure the heating rate.



The “pseudo heating” - the extra emittance growth created by the energy offset of the electron beam seems to be a non-negligible part of the heating we observed last year, but it doesn't explain the whole picture.

# **APEX Plan for March 2 & 4 , 2022**

## **March 2, Wednesday : Session I**

### **1) Impedance measurement**

**12-16pm, 4 hours, injection, both rings**

Mike Blaskiewicz, Inst. experts, MCR

### **2) Injection damper test**

**16-17pm, 1 hour, injection, both rings**

Zeyi (Tommy) Tang, Rob, Michiko, MCR

## **March 4: Friday: Session II**

### **Spin transparency mode test**

**8am-14pm, 6 hours, injection, yellow ring**

Haixin, Vasiliy, spin experts, MCR