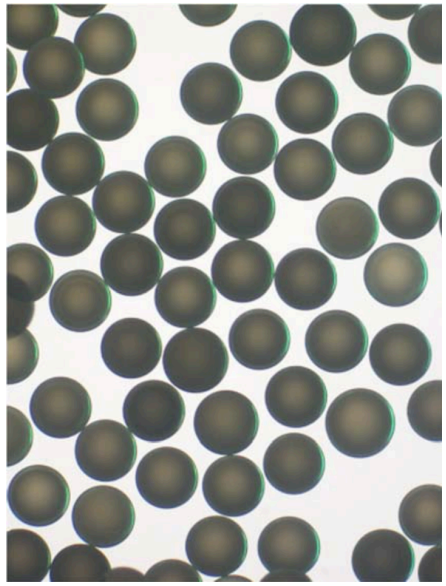
Update on H_2 Recombination

T. Sekiguchi

2019. 12. 6

H_2O_2 Resistant Ion Exchanger

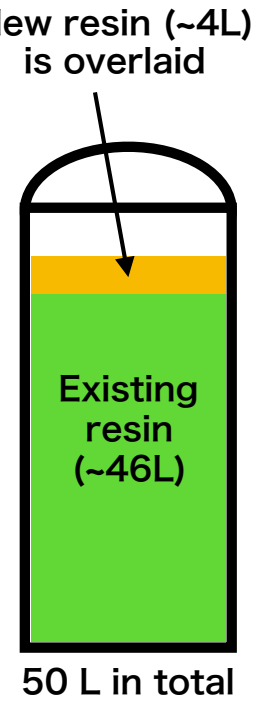
- **New resin**
  - Resins produced by LANXESS and its performance proved by EBARA
  - I contacted the person in charge of the new resin and he was very interested in the application of this resin
  - As a trial, this resin was put into one IE bottle for a test
    - 4L of the old resins were replaced with new ones
  - To be tested during next beam time



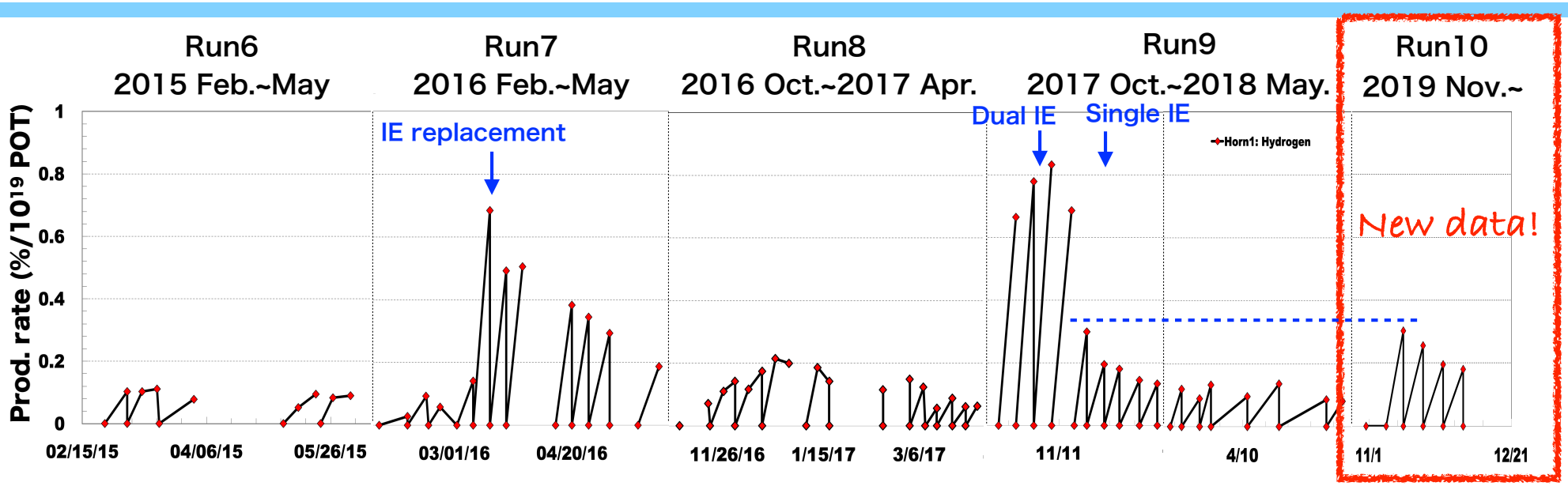
Remove existing resins

Put new resins

Completed IE bottle



Ion Exchanger Effect on H_2 Concentration

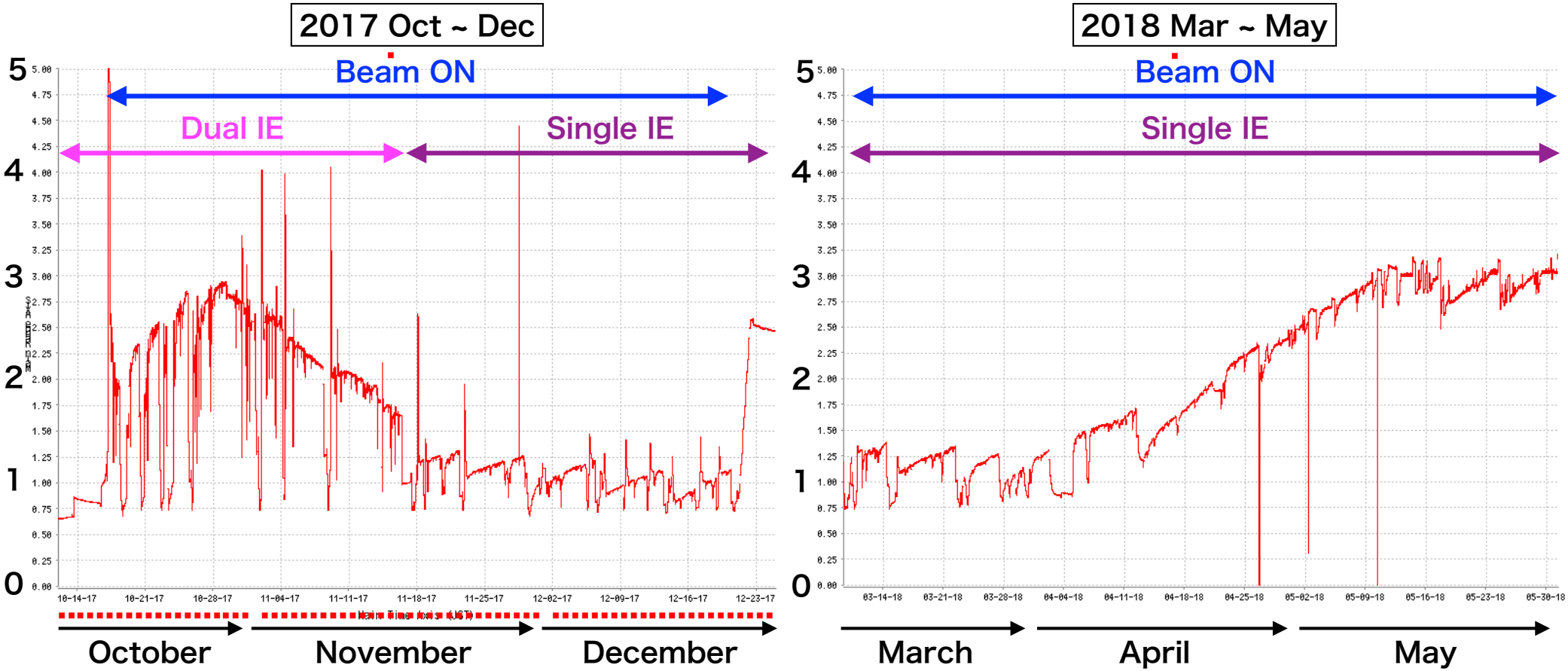


Run period	Run6	Run7	Run8	Run9-1	Run9-2	Run9-3	Run10
Configuration	Single (old)	Single (new)	Single (old)	Dual (new)	Single (new)	Single (new)	Single (new)
Beam power (kW)	330	390	470	450	475	485	420~496
H_2 concentration (%)	0.4	2.5	1.5	4.0	1.0	2.4	1.4
Production rate (% / 10^{19} POT)	0.173	0.683	0.215	0.832	0.299	0.137	< 0.303

- H_2 production rate rapidly increased after Ion exchanger replacement
- Production rate with new Ion Exchanger (IE) is almost comparable to that with usual new IE

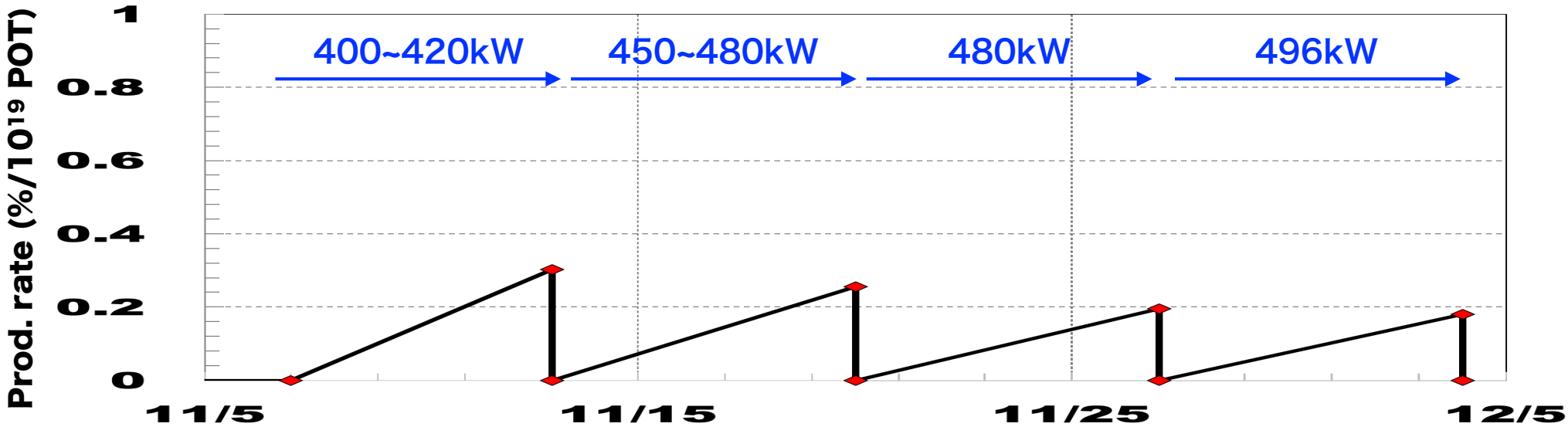
Water Conductivity Trend in Past Runs

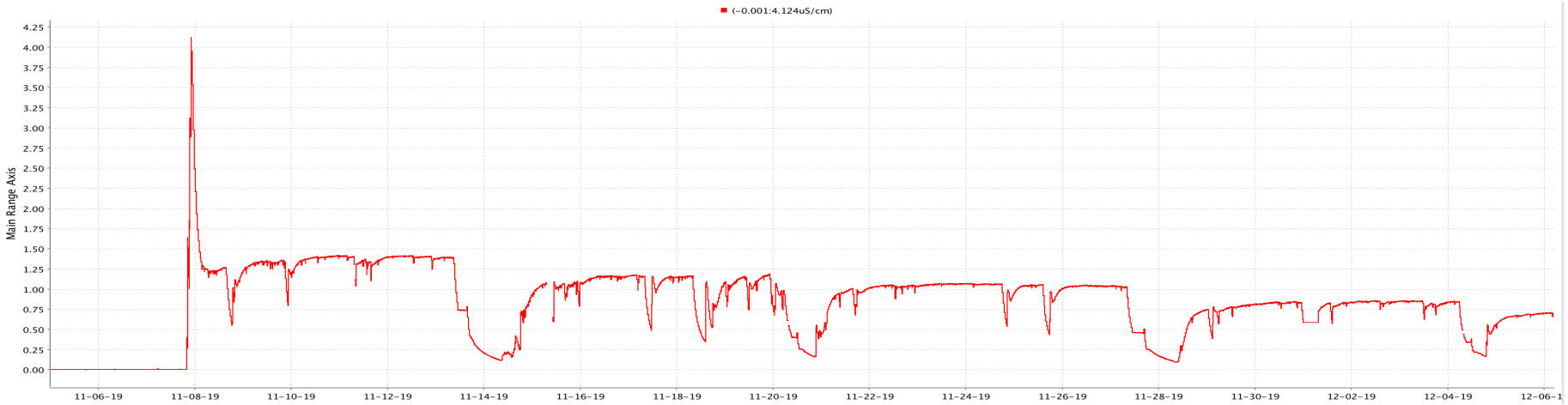
- **Water conductivity**
  - A strange behavior during dual IE operation
  - Low conductivity during single IE operation, but still increased in a week
  - Conductivity got increased around middle of April
    - This indicates lifetime of IE ⇒ **~6.0 x 10^{20} POT (or 2~3 months)**



Correlation between H_2 Concentration and Conductivity

- Both H_2 production rate and conductivity got decreased as beam power increased
- Conductivity is quite stable
- Long-term performance (such as lifetime) should be checked
- Also good to measure H_2O_2 concentration in the cooling water





Next Plan

- FY2019
  - Check the long-term performance of the new IE
  - Preparation for modification of O_2 degasifier system
- FY2020
  - Complete the O2 degasifier system and operate it during next beam operation (in Fall 2020)