Overview of Soft-MPS

- **H/W (Power Supply etc.)**
  - Hard-wire
  - Soft-MPS
  - EPICS PV
  - EPICS IOC

- **Overview of Soft-MPS**
  - **Purposes of Soft-MPS**
    - Beam permission
    - Beam stop (+Beam abort)
    - Avoid damage from a strong beam
  - **Temporary implement**
    - When new PVS from across multiple hardware

Example 1. Linear motion guide

- There are several linear motion guides
  - 3D scatterer @ D1
  - Multi Ribbon Profile Monitor (MRPM)
  - Injection area (INJ) @ D1
  - Slow Extraction area (SX) @ D2
  - Extinction monitor @ D3

- **Example 1. Linear motion guide**
  - Aim of Soft-MPS in this case
    - Linear motion guides are used only for studies. After the study finishes, it should be removed.
    - In operational mode, Soft-MPS would make an alarm when linear motion guides are still in the beam line.

Example 2. MR INJ-MRPM

- **Aim of Soft-MPS in this case**
  - INJ-MRPM uses delicate ribbons
  - Ribs would be damaged even by a single shot of high-intensity beam
  - Soft-MPS would make an alarm when beam intensity of the next shot is too high

- **Allowed conditions**
  - When INJ-MRPM is in the beamline and 1. The beam bunch used is only in a specific place
    - MROC/TS/CERB/MBRKB71 ~ K2 ~ K8
    - MROC/TS/CERB/MBRKB72 ~ K1 ~ K3
    - Only this bucket is exist and others are no exist

- **2. Beam extraction time is only 100 turns or less**

- **A Soft-MPS setup was implemented using beam parameter PVS**

Example 3. Coil interlayer voltage

- **B15D magnet failed in March-April 2019**
  - B15D is a bending magnet in 3-50 Beam Transport
  - It became unstable since March 15, because of coil inter-layer short. Beam operation stopped.
  - We started to measure inter-layer voltages of coils and temperatures of cooling water.
  - New SoftMPS was implemented using voltages and temperatures. It would stop beam operation when observed PV values are out of threshold values.
  - Apr. 01, beam operation restarted successfully
  - Apr. 24, B15D magnet fail again
  - MR operation stopped again
  - We decided to suspend MR beam operation
  - May 09, we disabled the Soft-MPS

- **Soft-MPS setup in 2018 spring, 9 Soft-MPS signals are currently used. As more Soft-MPS signals are expected in the future, we need to discuss the policy.**

the next deployment

- **Care after introduction**
  - Exclude when finished using, like the B15D voltage
  - Need to replace software with hard-wire as soon as possible.

- **Basic policy of introduction is important**
  - Do not concentrate responsibility
  - It should not to add easily

- **Soft-MPS will increase in the future**
  - LCR temperature, new device, etc.
  - I think, not very welcome