Development workflow and software distribution at ESS and In-kind partners

- **Development Machine (DM)** provides unified development environment, can be Virtual or Physical.
- **ESS EPICS Environment (EEE)** on a centralised server, available through NFS. Provide bundles development environment for easy deployment.
- **EEE server** also maintain boot service for Control Boxes.
- **Rsync Server**, to synchronise EEE server with In-kind servers by Owncloud.
- Git repository available also for In-kind partners.
- New module in a **Git repository** will be automatically installed by **Jenkins** on the ESS server and available for all In-kind partners.
- In-kind partners can use the same way to develop their own modules.
- **Standardisation in production of Input Output Controller (IOC)** by **IOCFactory**.

Sample Environment System for ortho to para Hydrogen conversion

- **Hydrogen (H2)** exists in two quantum states, ortho and para depending on its spin orientation.
- **Ortho H2 must be avoided** in moderator after spallation process due to higher absorption for neutrons, thus conversion to para H2 is necessary.
- Para/ortho ratio can be measured by **Raman spectroscopy**.
- Conversion is done in low temperature (~20K) in the presence of paramagnetic substance.
- Cooling Hydrogen is done in a **Close Cycle Refrigerator**.
- In order to get high para H2 concentration (~99%) temperature and pressure must be well controled.
- **EPICS** is used as a backbone control system.
- **Lakeshore 366** was used to control temperature with direct access to network.
- **Kurt L. Lesker 392** pressure gauge with Moxa adapter RS458 to TCP/IP to control pressure.
- **QEPro spectrometer** was used to measure Raman spectra, access via Control Box. (fanless PC).
- Data are archived on a data storage server and can be retrieved for future analysis.