WP1 Secondment Task 1.2

- **Name:** LI Meng
- **Institution:** IJCLab(France) and IHEP (China)
- **Contact person/supervisor at your institute:** BAMBADE Philip(IJCLab), GAO Jie and WANG Dou (IHEP)

Overview of your research

Fast luminosity monitoring and injection beam loss analysis at SuperKEKB

☐ **Setting up a realistic simulation of the injection system into the HER**

- **A detailed HER injected beam losses and related backgrounds simulation framework was developed.**

    -**Injection errors** mainly affect injection efficiency → Injection tolerance measurement

    -**Non-linear factors** (beam-beam, cancel coil error) affect both injection efficiency and BG→ Beam-beam measurement

    -**Small vertical collimator D01V1 aperture** tuning can significantly reduce the injection BG→ D01V1 tuning measurement

    -**Bunch-by-bunch feedback system** can significant improve injection efficiency (by 40%)

    -**Tunes** affect both injection efficiency and background-related beam loss

    More validation experiments needed

- **Some validation experiments were conducted during 2024 run with newly installed CLAWS sensor and ECLTRG, shows a good qualitative agreement between the simulations and measurements.**

WP1 Secondment Task 1.2

☐ HER injection beam loss study

- **Name:** LI Meng
- **Institution:** IJCLab and IHEP
- **Research Period: 2025/10/07 – 2025/12/29**
- **Contact person/supervisor at your institute:** BAMBADE Philip(IJCLab), GAO Jie and WANG Dou (IHEP)
- **Contact person/supervisor at KEK, if any:** IIDA Naoko, FUNAKOSHI Yoshihiro, KAJI Hiroshi
- **Funded by EAJADE and TYL**

Research Plan

- **Focus on Geant4 simulation based on basf2, connect SAD simulation to Geant4** (with help of Koga-san and Qingyuan)
- **More validation experiments if there is a chance**

  beam-beam study under high bunch current (with help of Funakoshi-san, kaji-san)
  collimator tuning (with help of Tanaka-san)
  bunch-by-bunch feedback measurement (with help of Iida-san, Ohnishi-san)
  Cancel coil error correction related measurement (with help of Iida-san)

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Overview of your research

Fast luminosity monitoring and injection beam loss analysis at SuperKEKB

☐ **Operation and upgrade of the LumiBelle2 fast luminosity monitor**

- In 2024, the LumiBelle2 was operated successfully at KEK
- Conducted data analysis based on 2024 run to estimate the performance of Diamond sensors
- Tests of LGAD sensors in LumiBelle2 (Feb. 2025) -> radiation hardened version from IHEP-Beijing used in ATLAS HGTD
  we plan to add LGAD sensors to LumiBelle2 operate alongside the existing diamond detectors, in collaboration with IHEP. Initial tests (Feb. 2025) using a beta source showed good results.

WP1 Secondment Task 1.2

☐ Operation and upgradation of LumiBelle2

- **Name: BAMBADE Philip**
- **Institution:** IJCLab/CNRS
- **Research Period: 2025/10/29 – 2025/11/08**

- **Contact person/supervisor at KEK, if any:** IIDA Naoko, FUNAKOSHI Yoshihiro
- **Funded by EAJADE**

- **Name: Wallon Sandry**
- **Institution:** IJCLab/CNRS
- **Research Period: 2025/10/29 – 2025/11/05**

Research Plan

- **Restart LumiBelle2**
- **Upgrade LumiBelle2 with LGAD sensors**
  install two new LGAD sensors prepared by Yunyun Fan from the IHEP group, use together with existing sCVD diamond sensors during 2025-2026 operation (she will also be there from 2025/11/03–2025/11/07, along with two IHEP students)
- **Schedule a special visit to LumiBelle2 for Robert Kieffer, as well as discussions**
  focus on preparing the applications for Pablo Mooney (a doctoral student starting his thesis at CERN) and others to become Belle II members as guests of the IJCLab group and contribute to LumiBelle2.