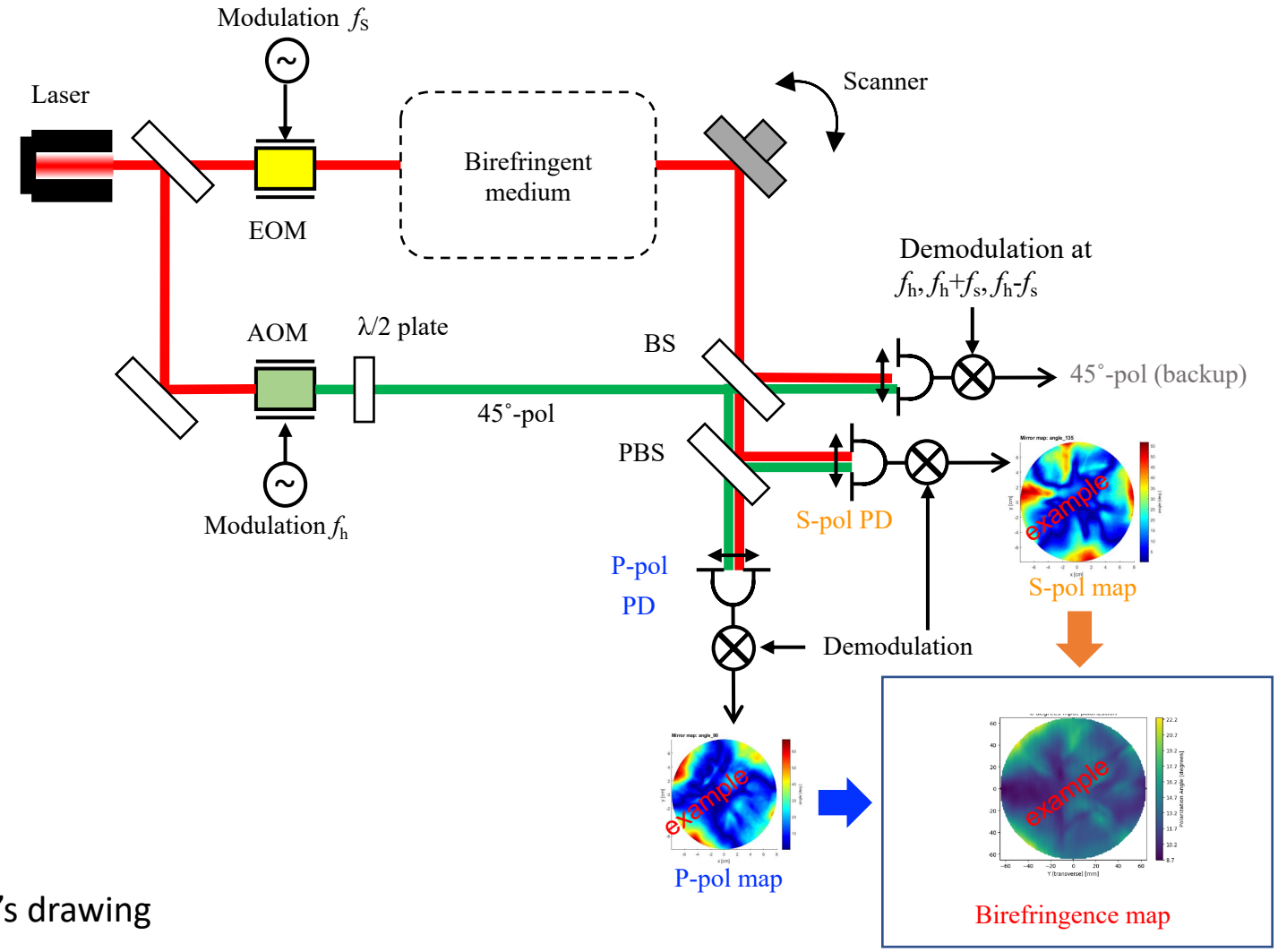
Birefringence Phase Camera

- **We would like to propose to measure the KAGRA beam using our new kid of phase camera**

- Evidence of ITM birefringence in KAGRA
  - Measurement of the transmitting wave front error
  - P-pol observed on POP table. Image is dirty
  - Larger imbalance between X and Y → increased laser intensity and frequency noise at DARM
  - Michelson contrast defect
  - Possibly more scattered light and A2L coupling

- The devise can (next page) directly measure the amplitude and phase maps of S- and P-pol beams
- → Characterize the birefringence of the ITMs
- We don’t have to break the already installed setup

Birefringence Phase Camera



Based on Agatsuma-san's drawing

Plans

- A complete set of a conventional phase camera is borrowed from University of Birmingham (2021 Nov -)
- Upgrade the phase camera and test the new feature at Cardiff University (2022 Jan?)
- Measurement in KAGRA (sometime in 2022?)
  - Where and how to get the reference beam?
  - Design of the optical setup for the detection part?

- Hiher PRC loss (is this still valid?)