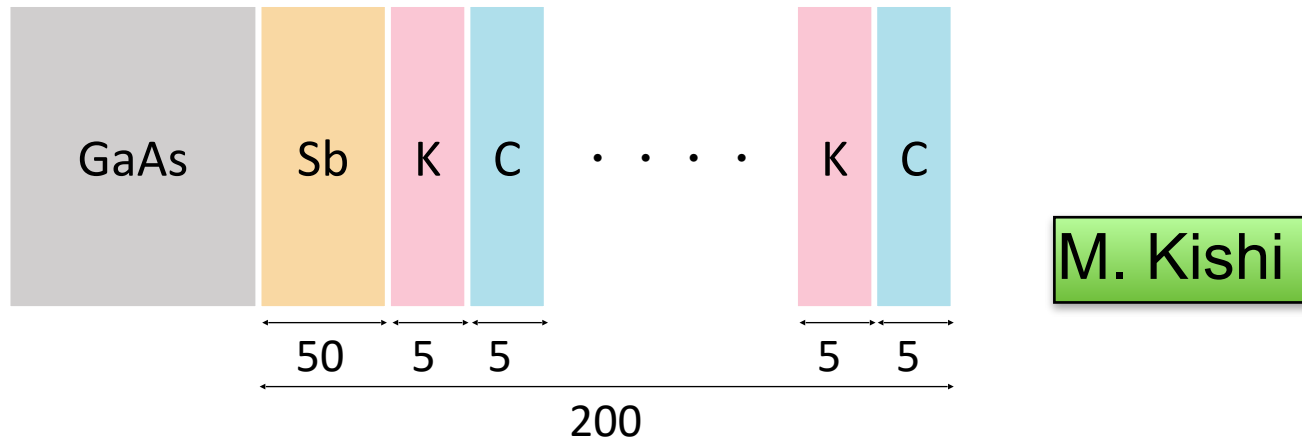


Polarized Cathode Development Update

Zachary J. Liptak

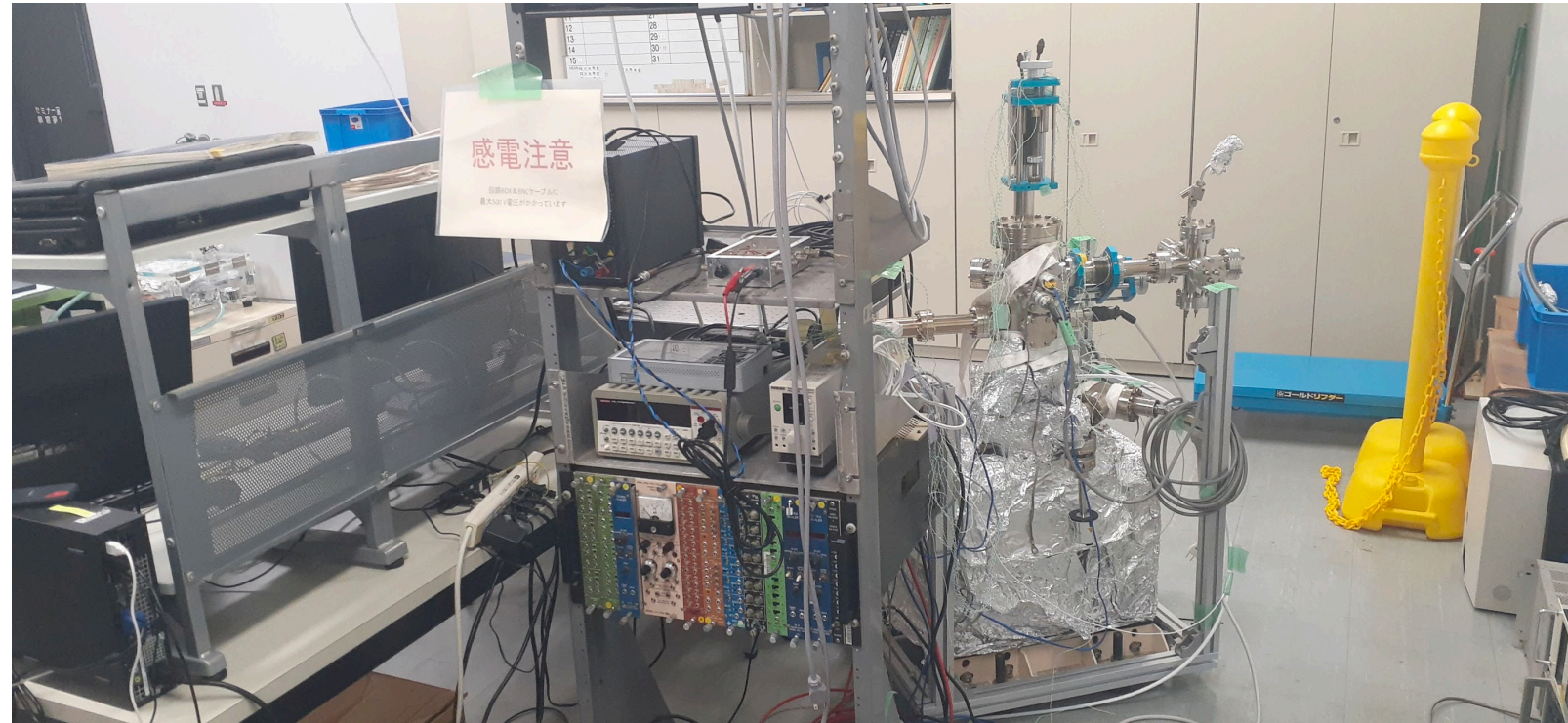
Spring Preparations and Updates

- At January B2GM, our student Misato Kishi was performing an experimental run with Sb-Cs-K-O thin film production.
 - Unfortunately the produced cathode wasn't able to produce a verifiable signal.
 - She's since graduated and moved on to a Masters' in medical physics research



Spring Preparations and Updates

- We're been preparing for a new experimental run to begin after IPAC
 - Moved to a new lab space at the start of the academic year (April)
- Had vacuum pump repaired
- Purchased new thin-film controller
- Updated computer control software
 - Also moved to Windows 11, causing failure → need to downgrade to 10
- L. Guo will be visiting from Nagoya U. after IPAC and we'll carry out a new run to recreate the thin-film cathode shown on the previous slide.
- Assuming a positive result, we can resume testing new thin-film varieties.



US-Japan Proposal Result

Unfortunately, the US-Japan proposal for combined Cathode testing + magnet R&D was denied.

The US side recommended 1 year of seed funding, but the Japan side was concerned about lack of involvement on the KEK side, and overall we were turned down but encouraged to reapply. Hopefully with further communication with the KEK accelerator team this year, we can secure more cooperation and have a successful application in the next cycle.

Japanese side comments:

This is a proposal to support R&D for polarization physics by implementing a longitudinally-polarized electron beam at the interaction point (IP) of SuperKEKB. The possible physics topics include measurement of the weak mixing angle θ_w , dark sector searches, elucidation of the τ g-2 value and so on. The hardware R&D items include a polarized electron source, spin rotators up- and downstream of the IP. While the RPC finds the proposed research interesting to develop a unique option for the high energy physics program at KEK in the future, it is required to develop deeper discussions to clarify the physics case, and plan the hardware R&D together with KEK researchers.

Therefore, the RPC does not recommend approval.

U.S. side comments:

This proposal will develop conceptual designs for the spin rotator magnet coils, along with their associated support structure and cryostat with current leads and cryocooler based cooling, that meet SuperKEKB optics, installation space and safety requirements. KEK, ANL and U. of Louisville will coordinate on optics/spin tracking and IP polarization diagnostic simulations. Hiroshima U. is responsible for the R&D relevant to developing the polarized source.

This work takes advantage of specialized expertise at US and Japanese institutions to develop a conceptual design that could expand the scope of Belle-II to include precision electroweak measurements with polarized beams that have significant discovery potential

Recommended as a seed proposal for one year.

After discussion, the joint panel recommends not to support this proposal. Proponents are encouraged to submit a stronger proposal after discussions with accelerator staff at KEK.