

Towards SPS GF PoP Experiment

Summary and next steps.

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with many thanks to everyone else on the very
enthusiastic team!

Main outcomes

- Foresee deterministic scanning and data logging of the parameter space (x,y,t,γ) . Ranges still to finalise, but conceptual work on controls architecture and implications can already start – **manpower** could be an issue. Strong link to detector performance and integration time.
- Atomic physics starts being really interesting if 10^{-5} absolute energy calibration of the resonance can be obtained -> **look with SPS team at energy stability and calibration**
- Investigation of other isotopes and transitions ongoing (source) – keep thinking of clever ways to reduce systematics on absolute resonance energy
- Photon fluxes simulated and cross-checked, maps and energy distributions available for any location downstream IP as a function of radius to define detector requirements
- Cooling still looks feasible, better for shorted ion bunches

Main outcomes

- Big uncertainty on the background for Xray detector, also no expertise at CERN for these detectors. **Detector concept is a key point to advance on now.** X-ray detector location should be at least 10m downstream the IP
- Interest to try and look again at extracting the 'core' X-ray photons from the vacuum chamber, will revisit the orbit bump schemes
- Impedance should not be an issue but need to look at whole vacuum sector
- **Agreed to add 2 BPMs** either side of cavity for ensuring 'day-zero' spatial overlap.
- Laser system and FP cavity concept advancing, questions on controls interface (FESA). Information needed now on **synchro scheme, alignment and tunnel environment (temp, humidity, vibration)**. Check integration cross-section.

Main outcomes

- Transport high pulse energy in air, lower power pulse in fiber.
- 90deg scheme with 532 nm laser to investigate as backup, also may open new possibilities. **Will cross-check photon production.**
- For radiation to electronics, looks like levels during experiment operation could probably be OK (tbc), but risk from p+ operation is high -> **design experiment to allow laser & key electronics to be installed after p+ operation in a 24h slot?**
- Can profit from existing radiation-resistant development (LHC triplet alignment) and RWG database of components. **Also need to look at pressure around ring to get local losses.**
- RF – laser synchro will be based on AWAKE solution, but with variation of the frequency which adds complication, **need to develop the draft FS**

Deadlines: phase 1

- Detailed Proposed: End June/July 2019 (~6 months)

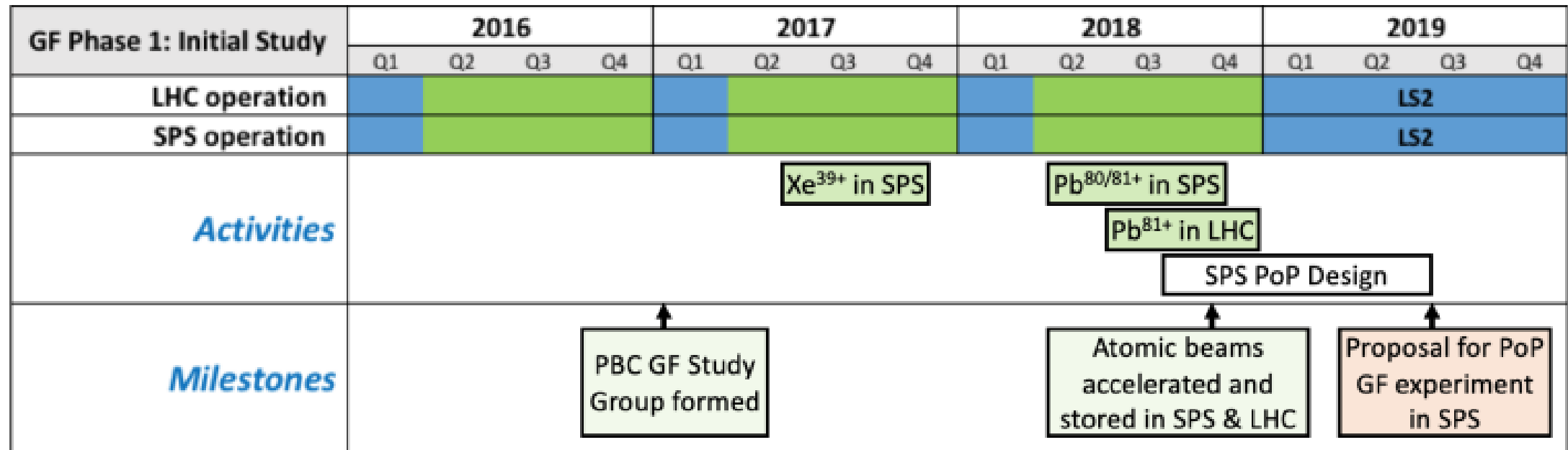


Fig. 1: The timeline of the Gamma Factory Initial Study, Phase 1 activities – years 2016–2019.

Deadlines: phase 2

- Systems ready for installation: End December 2021 (30 months)
- Beam tests: 2022 and 2023

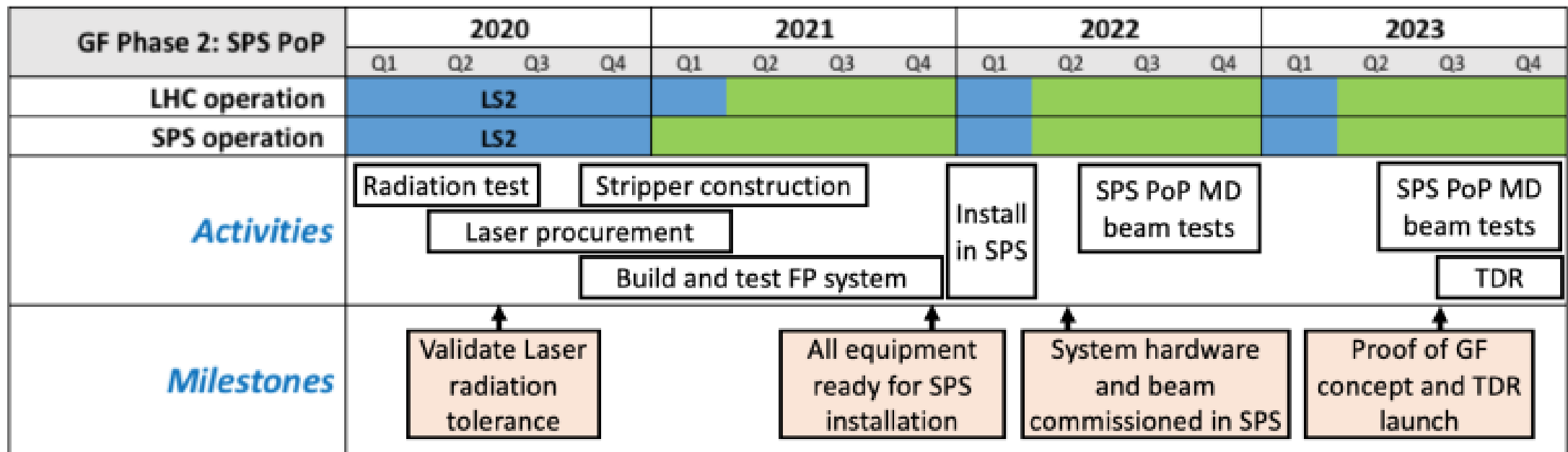


Fig. 2: The timeline of the Gamma Factory SPS PoP experiment, Phase 2 activities – years 2020–2023.

Concluding remarks

- Great progress, even since Krakow meeting which was not so long ago
- Yellow Report – need to fill in the remaining PoP sub-chapters and maybe review the layout
- Next meeting planned in LAL Orsay June 3-7.
- **Deadline for finishing the YR - before Granada?**
- **Deadline for “detailed proposal” - planning, costs, manpower?**
- Thanks to everyone for the great efforts and the enthusiasm!