

## LC-SPT Collaboration – hoped-for resources

1<sup>st</sup> September 2022

- We're encouraged by Snowmass 2022, where a Higgs Factory was widely recognised to be the top priority for particle physics, after completing the commitments to High-Lumi LHC.
- This was taken to mean a linear collider starting at 250 GeV, promptly upgradeable to about 550 GeV (thus extending to t-tbar-Higgs)
- It could be:
  - ILC in Japan if they decide soon, which seems unlikely
  - ILC in USA, or C-cubed if it passes its 3 GeV demonstrator – there could be showstoppers
  - CLIC at CERN
- There was no interest expressed at Snowmass to construct a circular e+e- collider (such as FCC-ee) in the USA, due to the limited energy reach and the possibly unaffordable wallplug power.
- Now it's down to P5. The appointment of Hitoshi Murayama as chair, who at Snowmass was one of the most vocal proponents of the Higgs Factory, is encouraging. Nima Arkani-Hamed has also expressed great enthusiasm: "The Higgs is the first really new elementary particle we've seen. We need to study it to death!"

- If this perspective is shared by the UK HEP community and by STFC, we envisage the enthusiastic rejuvenation of the LCUK consortium, which we hope will help with coordinating the successors to the three LC detector R&D collaborations that were previously thriving in the UK, covering:
  - **Vertexing and tracking** (where our Silicon Pixel Tracker (SPT) is the most adventurous and potentially highest performance tracker suggested for the linear colliders, world-wide). Furthermore, our vertexing software, based on topological 3D vertex-finding, (extended by Tokyo U colleagues from LCFIVertex to LCFIPlus), still delivers the highest performance in the world, outperforming recent efforts with neural networks.
  - **MAPS-based Electromagnetic Calorimetry** (building on the pioneering work of the UK-CALICE collaboration, which is now gaining support in Europe and in USA – for example Jim Brau’s group at Oregon U)
  - **DAQ**, where the UK has particular expertise, was making important contributions, and could again if funding is restored.