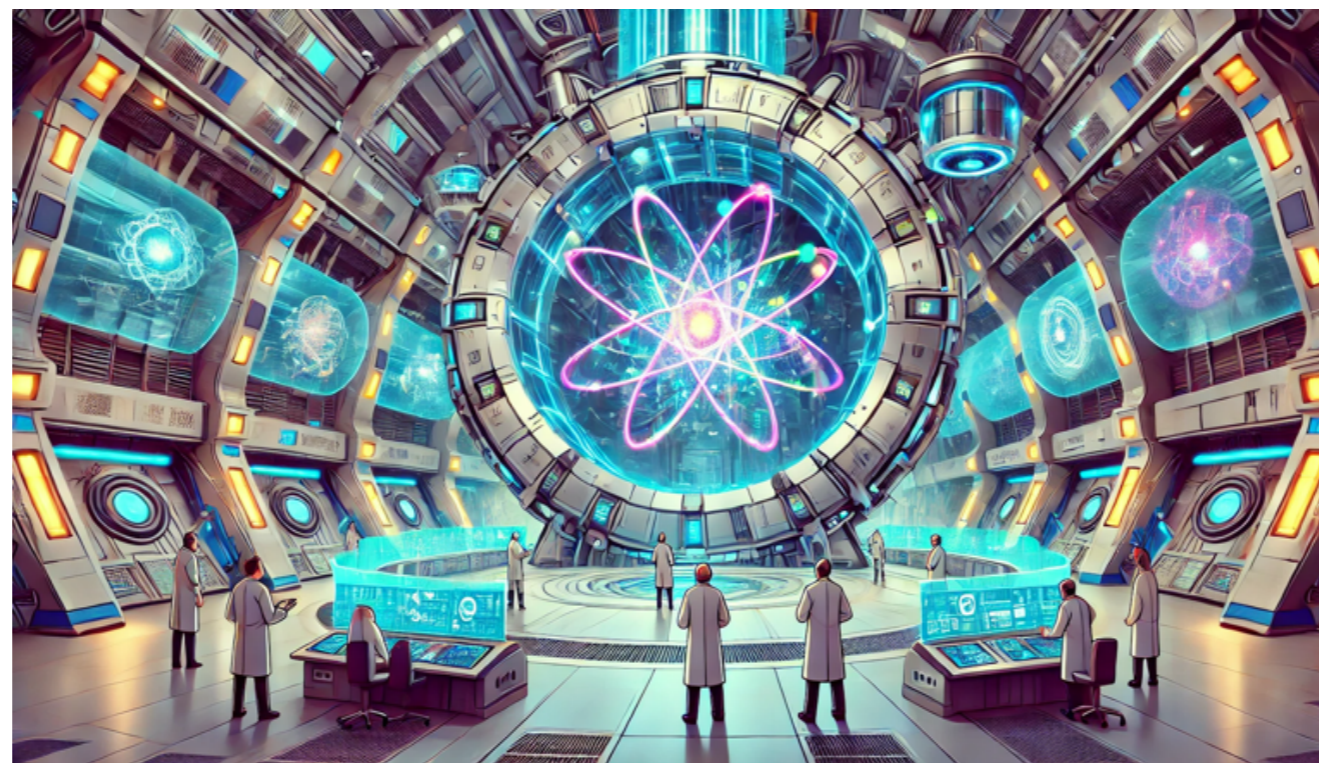


Summary of SWOT analysis future scenarios and survey

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SWOT for various scenarios

- FCC-ee
- CEPC
- LC [Europe]
- LC [Japan]
- Diversification (PP+APP)
- Muon Collider

SW = characteristic of project vs. OT = external.

Disclaimer: result of informal brainstorming during staff meeting

Summary courtesy of Patrick Koppenburg

- **Strengths:** At CERN; high lumi at Higgs, tera-Z , multiple IPs (redundancy); Clear upgrade path, FCC-hh; we know how to build it; continuation of expertise; attracts talents long term.
- **Weaknesses:** Cost (hh even more); environment, soil disposal; limits diversification, future options; coordination across CH/F, governance; limit to beam E; only 1 location possible; no polarisation; hard to sell to public; magnets for hh unproven;
- **Opportunities:** long-term continuation; great for Europe; Flagship at CERN, secures its future; Magnet R&D (hh); lower cost for Europe; concrete plan for 60 years.
- **Threats:** Cost; late; CEPC; If it fails it's the end of HEP; HL-LHC needs to end; political risk; hard to sell to other fields, threat to other funding; energy consumption; sustainability; lose talents;

See also FCC-ee

- **Strengths:** cheaper; earlier; simple approval process; ZH at the start; saves us money; competition with Europe;
- **Weaknesses:** openness, communication, collaboration, data access; CERN/Europe leadership loss; can they do it?; limit to beam E; political climate; travel; sustainability; no flagship at CERN;
- **Opportunities:** Earlier timeline; Lower cost for Europe; Positive relation with China; new direction for CERN; Cross-check of results of FCC; more funding free in Europe;
- **Threats:** (Geo)political; End of HEP in Europe, CERN leadership; Not accessible; What if it fails?

Linear Collider in Europe

- **Strengths:** Higher energy, polarisation; feasible; neutrino programme; physics at low and high lumi; upgradable, CLIC/wakefield; fits CERN budget; different R&D programme;
- **Weaknesses:** Single IP; lower lumi below tt; no feasibility study; Energy limited: low discovery potential; R&D needed for CLIC; too little R&D for LC
- **Opportunities:** Great physics, innovation in Europe; lower cost; flagship for CERN; cheaper option; accelerator developments; extendable in length
- **Threats:** CERN DG; FCC; HEP ends elsewhere;

Linear Collider in Japan

See also Linear Collider in Europe

- **Strengths:** Good to have a collider in Asia; They have expertise in e^+e^- ; open to collaboration; fills gap between HL-LHC and FCC
- **Weaknesses:** No flagship at CERN? Travel/sustainability; Is it still timely?
- **Opportunities:** Political stability; second large facility in the world; Not our money; participation through CERN; relationship with Japan; opens floor for muons;
- **Threats:** Lack of (inter)national enthusiasm; Japanese politics; stops HEP in Europe; Smaller physics programme than FCC; FCC; smaller community; Upgrades may not happen;

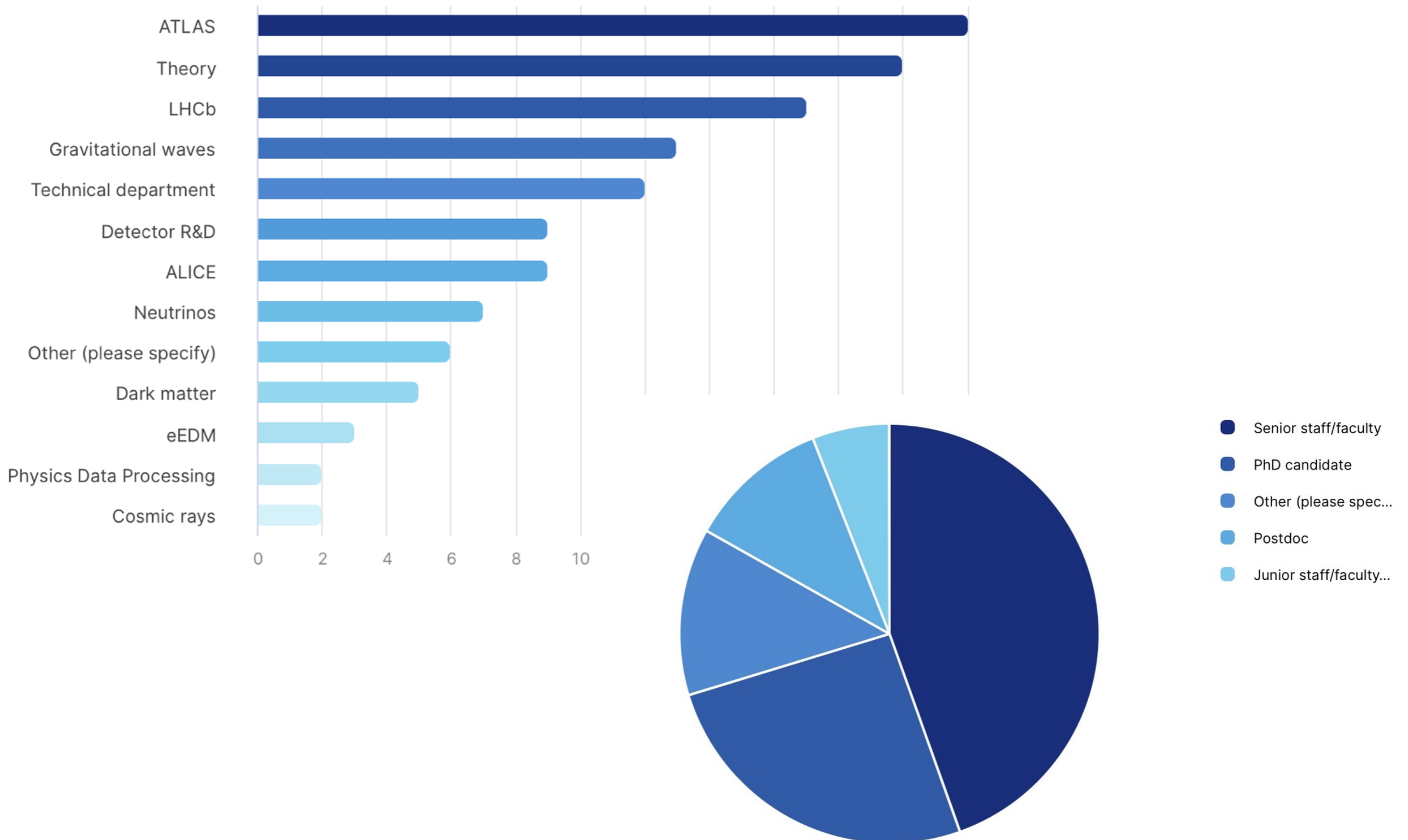
Muon colliders

- **Strengths:** low synchrotron; new technology; low running cost; NP opportunity; Higgs pole and high energy; staging possible; knowledge transfer; small; coupling to 2nd generation; highest priority for US; excitement from ECR; synergies with HL-LHC for timing; R&D lower cost;
- **Weaknesses:** Not yet proven; neutrino radiation; no flagship at CERN (if built at Fermilab); uncertain timeline and costs;
- **Opportunities:** Excitement for the field; CERN has infrastructure for R&D; Links with Fermilab; new technologies; neutrino source; innovative; sellable to public; sustainable; smaller; challenging but clear goal;
- **Threats:** at Fermilab; ν flux and local politics; high risk; takes to long; In Europe delays due to HL-LHC; may not work; competition Europe/USA;

Diversification

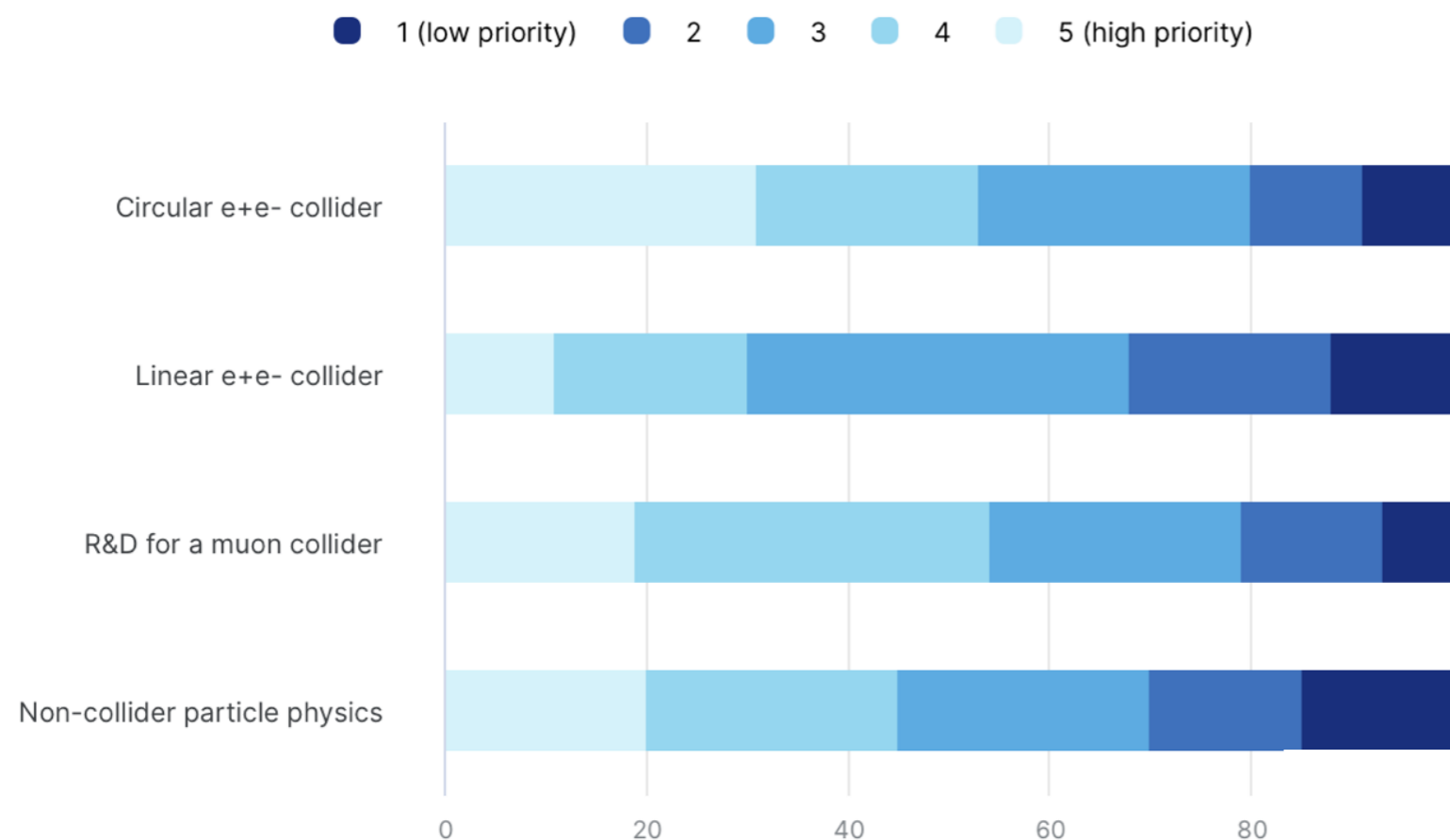
- **Strengths:** Broader community; boost for APP; viability for CERN; detector R&D; more attractive to funding agencies; good for public opinion; better for other experiments;
- **Weaknesses:** ET is too different; too many different projects; lose technology at CERN; diverting resources; lose CERN as hub, political leverage; no access to high energy frontier;
- **Opportunities:** any hint will provide arguments for next facility; focus on AI, quantum; Quantum sensing; links to other fields; Find new physics in new ways, axions; revolution in v ; multiple locations; collaboration PP/APP;
- **Threats:** FCC leaves no money; Loss of flagship programme; loss of collab. big science; threat to CERN; projects too small to make an impact;

Survey: representation

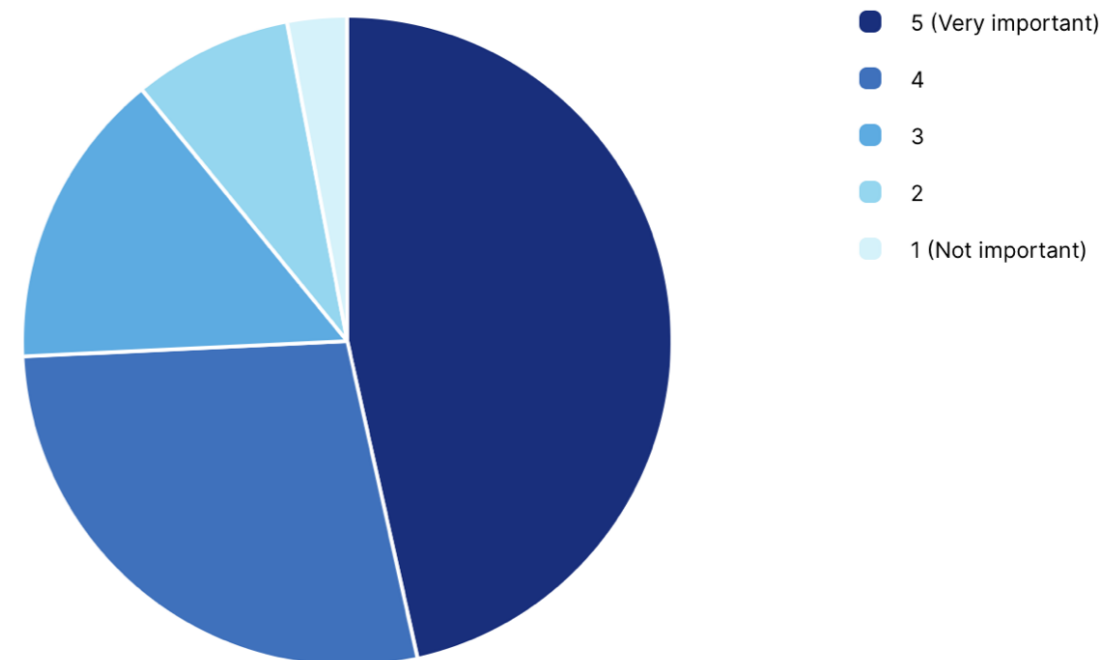


Survey: priorities

1. For the upcoming European strategy update, to what extent should Nikhef prioritize



2. How important is it that the next collider is built in Europe?



Survey: engagement

3. If you would like to get more involved in future colliders, how would you like to do that?

