

# Contents

Physics of Fundamental Interactions and Particles	1
1 Theory of Elementary Particles	1
2 Astrophysics and General Relativity	8
3 GERDA: Neutrinoless Double Beta Decay in $^{76}\text{Ge}$	11
4 Dark Matter Detection with XENON and DARWIN	15
5 DAMIC: search for dark matter using CCD detectors	20
6 Very High Energy Gamma Ray Astronomy with CTA	23
7 Search for the rare decay $\mu^+ \rightarrow e^+ e^- e^+$	25
8 The $\pi^+ \rightarrow e^+ \nu_e / \pi^+ \rightarrow \mu^+ \nu_\mu$ branching ratio	28
9 Particle Physics with SHiP	30
10 Particle Physics with LHCb	33
11 Particle physics with the CMS experiment at CERN	39
Condensed Matter Physics	45
12 Superconductivity and Magnetism	45
13 Phase transitions and superconducting photon detectors	49
14 Surface Physics	54
15 Physics of Biological Systems	59
16 Disordered and Biological Soft Matter	65
Infrastructure and Publications	70
17 Mechanical Workshop	70
18 Electronics Workshop	73
19 Publications	75