Contents

Physics of Fundamental Interactions and Particles 1

1 Theory of Elementary Particles 1

2 Astrophysics and General Relativity 9

3 GERDA: Neutrinoless Double Beta Decay in ^{76}Ge 12

4 Dark Matter Detection with XENON and DARWIN 17

5 Searching for Dark Matter and Neutrinos with CCD Detectors 22

6 Very High Energy Gamma Ray Astronomy with CTA 25

7 The $\pi^+ \to e^+\nu_e$ / $\pi^+ \to \mu^+\nu_\mu$ branching ratio 27

8 Particle Physics with SHiP 31

9 Particle Physics with LHCb 34

10 Particle physics with the CMS experiment at CERN 40

Condensed Matter Physics 47

11 Condensed matter theory group 47

12 Superconductivity and Magnetism 51

13 Phase transitions and superconducting photon detectors 55

14 Surface Physics 60

15 Physics of Biological Systems 65

16 Disordered and Biological Soft Matter 71

Infrastructure 77

17 Mechanical Workshop 77

18 Electronics Workshop 81

IPhO 2016 and Publications 84

19 International Physics Olympiad 2016 84

20 Publications 85