## Contents

| 1  | Preface  | 5  |
|----|--|----|
|    | Physics of Fundamental Interactions and Particles    | 1  |
| 2  | Theory of Elementary Particles                       | 1  |
| 3  | Astrophysics and General Relativity                  | 9  |
| 4  | Neutrinoless Double Beta Decay with GERDA and LEGEND | 14 |
| 5  | Dark Matter Search with XENON and DARWIN             | 19 |
| 6  | Very High Energy Gamma Ray Astronomy with CTA        | 25 |
| 7  | Particle Physics with the SHiP experiment            | 27 |
| 8  | Particle Physics with LHCb                           | 30 |
| 9  | Particle physics with the CMS experiment at CERN     | 36 |
|    | Condensed Matter Physics                             | 45 |
| 10 | Condensed matter theory group                        | 45 |
| 11 | Superconductivity and Magnetism                      | 49 |
| 12 | Phase transitions, materials and applications        | 53 |
| 13 | Surface Physics                                      | 58 |
| 14 | Disordered and Biological Soft Matter                | 62 |
|    | Infrastructure                                       | 68 |
| 15 | Mechanical Workshop                                  | 68 |
| 16 | Electronics Workshop                                 | 71 |
| 17 | Publications   | 74 |