In the following table, the indicative milestones for the main research tasks are summarized. For each area of tasks the participant that will coordinate the corresponding activities is mentioned. For each milestone the participating teams are listed. The overall programme will be coordinated by the *scientific committee*. The evolution of a work plan in theoretical physics research is affected by eventual new findings that may accelerate or decelerate the process significantly. Our experience from past projects tells us that the work should be monitored closely so that a redefinition of the plan can be achieved any time this is necessary. Such changes will need the prior approval of the Commission's services and in case major deviations are proposed, the Annex I needs to be amended.

(i) **Tools** **Coordinating participant: DESY**

(1) RENORMALIZATION:

Major milestones	Teams involved
1.1 Complete renormalization of the SM at two loops	2 4 7 9 10 12 13 16
1.2 Complete one-loop renormalization of the MSSM	2 3 6 7 11 17
1.3 Two-loop renormalization of the MSSM Higgs sector	2 6 7 9 17
1.4 Renormalization group improvement of physical observables	2 7 8
1.5 Spectrum calculations in extensions of the SM	2 3 6 7 15

(2) LOOP INTEGRALS:

Major milestones	Teams involved
2.1 Efficient numerical evaluation of multi-particle one-loop integrals	1 2 4 7 8 12 15 16 17
2.2 Numerical evaluation of two-loop vertices with internal masses	2 4 7 9 10 12 13
2.3 Numerical evaluation of two-loop boxes with internal masses	2 4 9 10 12 13
2.4 New and improved mathematical methods to solve loop integrals	2 7 8 13

(3) MULTI-PARTICLE AMPLITUDES:

Major milestones	Teams involved
3.1 Completion and automatization of arbitrary tree-order processes computations	1 2 4 7 8 10 13 14 15 17
3.2 One-loop corrections to three- and four-particle production	2 3 4 6 7 10 12 13 16 17
3.3 Study of tree and one-loop recursion relations for multi-particle processes	1 2 10

(4) MONTE-CARLO GENERATORS:

Major milestones	Teams involved
4.1 Construction and validation of standard event generators interface	1 2 4 7 8 13 14 15
4.2 Construction of automatic NLO multi-particle generator	1 2 4 7 8 10 13 15 17
4.3 Multi-particle event generators for LHC and ILC	2 10 12
4.4 Monte Carlo implementation of SUSY spectrum calculations	1 2 6 14 15

(5) COMPUTER ALGEBRA:

Major milestones	Teams involved
Development of packages for Feynman diagram calculations	2 4 7 8 13
5.1 Automatic generation of two-loop amplitudes	2 7 8 10 12 13 16
5.2 Automatic generation of one-loop amplitudes with more than four external legs	1 2 6 7 8 10 15 17
5.3 Parallelization of computer algebra codes	7 8 13

(ii) **Precision Calculations** **Coordinating Participant: PSI**

(6) HIGH-PRECISION PHYSICS:

Major milestones	Teams involved
6.1 Determination of EW parameters from two-loop observables	2 3 4 7 9 10 12 13
6.2 Weak corrections to strong interaction processes at the LHC and the ILC	2 4 7 9 10 12 17
6.3 Bhabha scattering and two-fermion production at two loops	4 13 16
6.4 Evaluation of subleading two-loop electroweak high-energy logarithms	7 8 12
6.5 Resummation of electroweak and strong high-energy logarithms	4 7 8 9 10 12
6.6 Evaluation of finite quark mass effects in the production processes at NLO level for hadron colliders	4 12 16 17
6.7 Monte-Carlo event generators with electroweak corrections for hadron colliders	1 2 4 7 8 12 15 16 17
6.8 Higher-order QCD corrections for light-candle processes at the LHC (Drell-Yan process, single W- and Z-boson production)	2 4 12 13

(7) MULTI-PARTICLE PRODUCTION:

Major milestones	Teams involved
7.1 Study of four-fermion production at e^+e^- colliders	1 4 7 12 15 17
7.2 Study of six-fermion production at e^+e^- colliders	1 4 7 12 15 17
7.3 Study of six-fermion production at the LHC	1 10 12
7.4 Numerical evaluation of one-loop amplitudes with more than four external legs	1 2 7 8 10 12 13 17

(8) TOP AND BOTTOM PHYSICS:

Major milestones	Teams involved
8.1 Study of standard and non-standard top interactions	2 3 4 5 7 10 14 15
8.2 Study of single top production at the LHC	3 15 16 17
8.3 Study of top-pair production at the LHC	2 7 10 12 15
8.4 Study of semileptonic and radiative B decays	2 5 9 10

(iii) **Discovery Physics** **Coordinating Participant: University of Durham**

(9) HIGGS BOSON(S):

Major milestones	Teams involved
9.1 Improved predictions for Higgs production and identification at the LHC	1 2 4–7 9 10 12–15 17
9.2 QCD and SUSY-QCD corrections to Higgs production cross sections and differential distributions at the LHC	1 2 4 6 7 12 13 15–17
9.3 Electroweak corrections to Higgs production cross sections and differential distributions at the LHC	1 2 4 6 7 9 12 13 15–17
9.4 One-loop and two-loop calculation of CP-violating effects in SUSY Higgs mass spectrum, production and decay	2 3 4 7 11 12 14 15
9.5 New sources of CP violation in extended Higgs sector	2 3 4 5 9 14 15

(10) SUSY PARTICLE PRODUCTION:

Major milestones	Teams involved
10.1 Study of SUSY particle production at the LHC	1 2 4–6 9 11–15 17
10.2 Full one-loop calculations for SUSY particle production and decay processes	1–4 6–8 11–13 17
10.3 CP-violating effects in SUSY particle production and decays	2 5 4 7 9 11 12 14
10.4 Study of flavour violation effects in the MSSM	2 3 4 5 7 9 11

(11) INDIRECT EFFECTS OF NEW PHYSICS:

Major milestones	Teams involved
11.1 NLO SUSY effects in radiative and rare B decays	2 7 9 10 12
11.2 Impact of SUSY particles on the determination of the CKM mixing matrix	2 5 9 10 14
11.3 Constraints from precision B and K physics on the SUSY spectrum	2 4 5 9 10 14

(12) ALTERNATIVE NEW PHYSICS:

Major milestones	Teams involved
12.1 Study of CP violation in the leptonic sector and leptogenesis	2 4 5 11
12.2 Study of neutrino physics in supersymmetry and other extensions of the SM	1 2 4 5 9 11
12.3 Cosmological implications of SUSY particles and their interactions: constraints from bounds on the dark matter relic density	1 2 4 6 12
12.4 Study of little-Higgs theories	3 13
12.5 Study of quantum effects from non-commutative space-time	1 4 7 11
12.6 Study of quantum effects of Kaluza-Klein towers	1 3 5 12 15

An indicative timetable is given below. Each major milestone indicated above is assigned a time interval, in months. It should be understood that in the beginning of this time interval, we expect to start having important results that will be completed at the end of it.

Major milestones	Time schedule
1.2 6.3 9.3 10.3 11.1 12.4	6-12
1.3 2.1 2.2 3.2 4.4 5.3 6.4 6.6 6.8 7.1 8.3 8.4 9.2 9.4 9.5 10.4	12-24
1.1 1.4 1.5 2.3 4.1 4.2 5.2 6.5 11.2 11.3 12.1 12.2 12.3	6-48
6.1 6.2 6.7 7.4 9.1 10.1 12.5 12.6	12-48
2.4 3.1 3.3 4.3 5.1 5.4 7.2 7.3 8.1 8.2 10.2	24-48