

FROM RESEARCH TO INDUSTRY

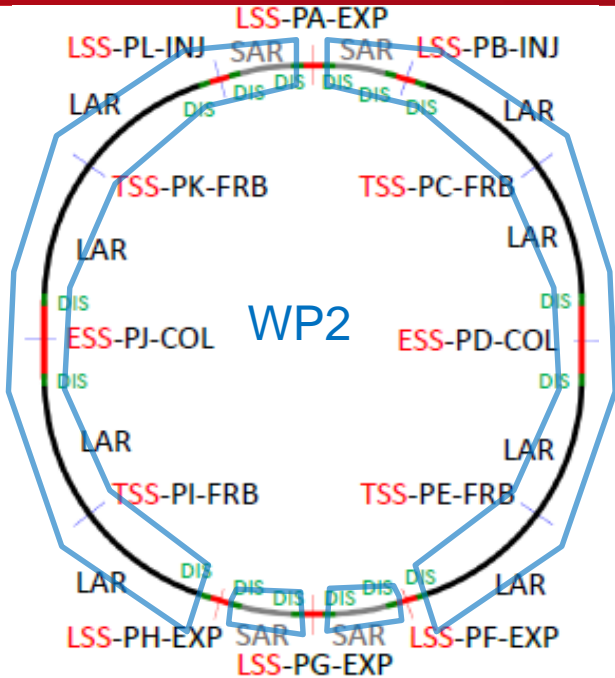


WP 2: ARC DESIGN AND LATTICE INTEGRATION

EuroCirCol kick-off meeting 3-4 June 2015 | Antoine CHANCE

OBJECTIVES, WORK BASELINE AND REFERENCE
DOCUMENTS, SCHEDULE

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Problematics:

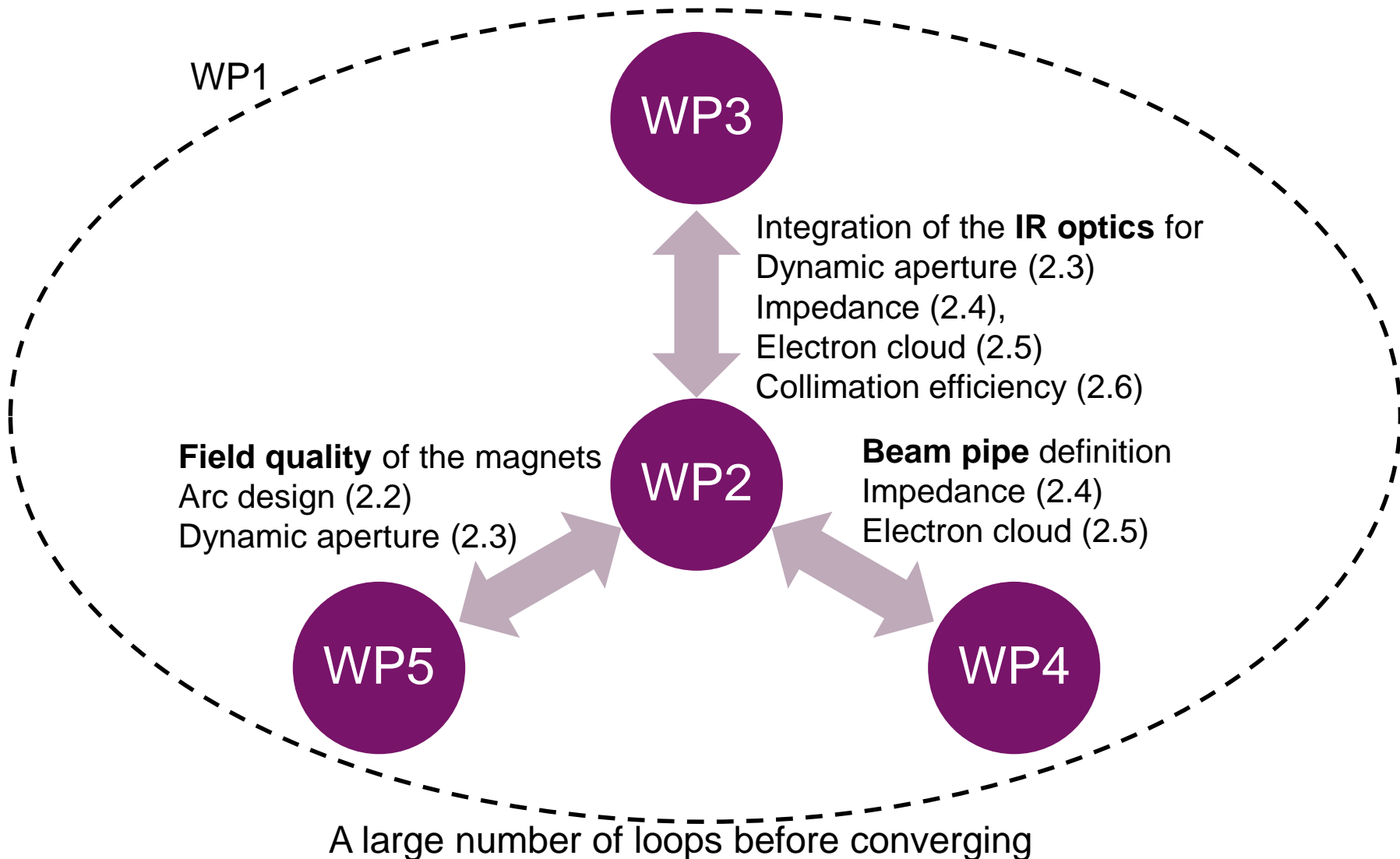
- Optimization of the arcs and of the extraction/injection/collimation sections (cost vs performance)
- Beam stability: dynamic aperture, impedance, electron cloud

Objectives of WP2s:

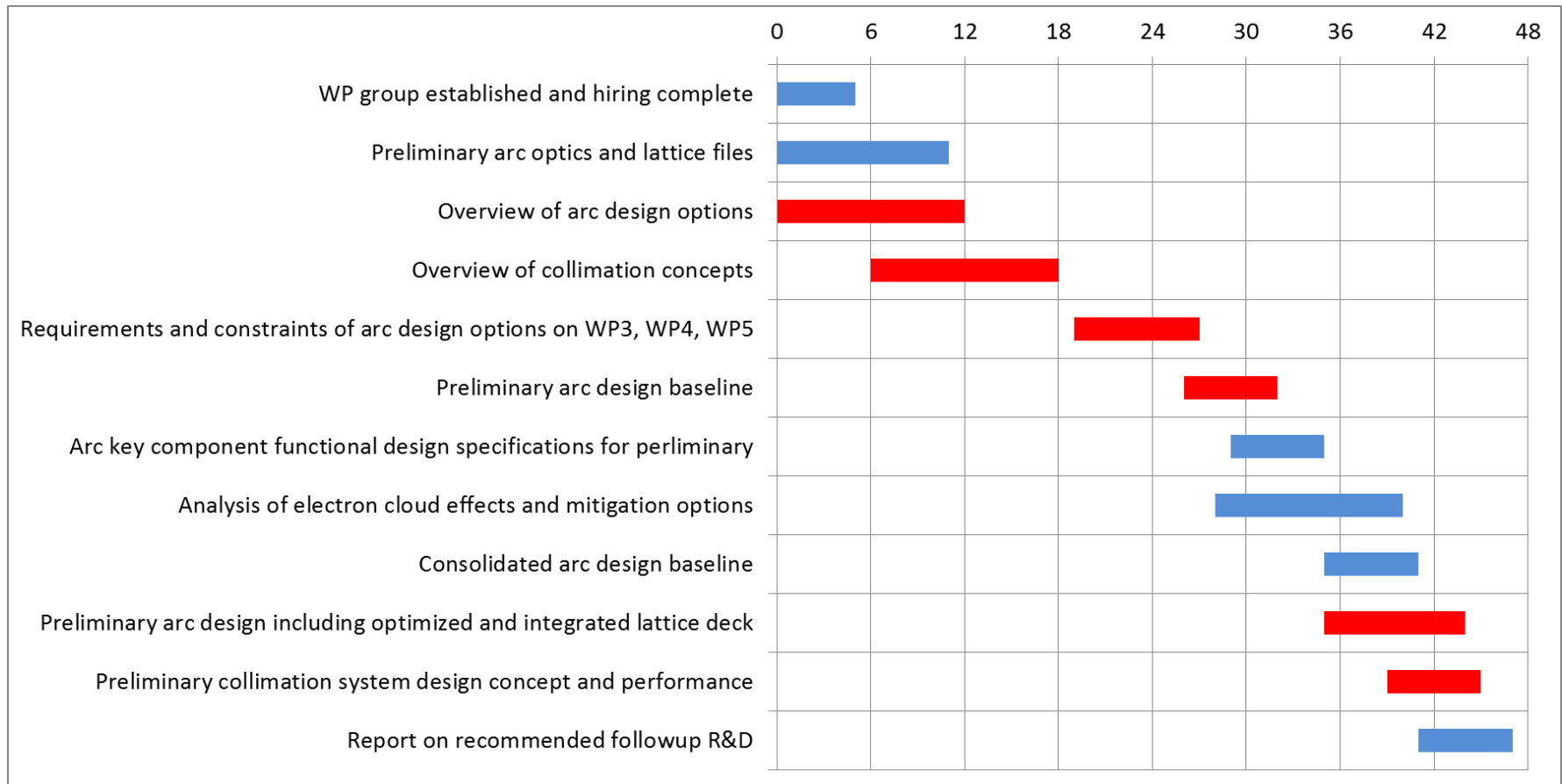
- Develop an optimized conceptual design of the hadron collider arc
- Evaluate and optimize the dynamic aperture and derive magnet field quality tolerances
- Develop a baseline conceptual design of the collimation sections
- Provide the key functional specifications for the beam pipe and magnets

The WP2 is divided in 6 tasks:

- **Task 2.1:** Work Package Coordination (CEA, CERN)
 - Coordination within the WP and communication with the other WPs.
- **Task 2.2:** Develop optimized arc lattice (CEA, CERN)
 - Explore the different arc optics and integration of the insertions.
 - Optimization of the baseline optics with non linear correctors.
- **Task 2.3:** Study dynamic aperture (CEA, CERN)
 - Non linear optimization of the line
 - Field quality requirements
- **Task 2.4:** Study single beam current limitation (TUD, CERN)
 - Impedance evaluation and study of its impact on beam stability
 - Mitigation of the beam instability
- **Task 2.5:** Understand and control impact of electron cloud effects (KEK, CERN)
 - Electron cloud studies
 - Mitigation of these effects
- **Task 2.6:** Develop optics concept for collimation systems (CNRS, CERN)
 - Collimation section optics
 - Tracking studies to evaluate the collimation efficiency



Description	Month
<p>D-2.1: Overview of arc design options Description of arc design options and collider layouts to be taken into consideration for further detailed studies. Summary of the relative merits, requirements, constraints and impacts of each of the options to be considered. Classification according to estimated value and realization risk.</p>	12
<p>D-2.2: Overview of collimation concepts Description of collimation system concept options to be taken into consideration for further detailed studies. Summary of the relative merits, requirements, constraints and impacts of each of the options to be considered. Classification according to merit and realization risk.</p>	18
<p>D-2.3: Requirements and constraints of arc design options on WP3, WP4, WP5 Estimates of requirements and limitations imposed by the options onto magnet field levels and qualities, intensity and energy limitations and physical constraints onto the experimental insertion region and onto the cryogenic beam vacuum system.</p>	27
<p>D-2.4: Preliminary arc design baseline Description of the arc baseline design including a list of beam-line elements (type, description, quantity, physical element characteristics). Description of the assumptions taken, requirements and constraints imposed onto the infrastructure and infrastructure services.</p>	32
<p>D-2.5: Preliminary arc design including optimized and integrated lattice deck Annotated beam optics and lattice files with specifications of the required magnet parameters (strengths and apertures) including consolidated position and element characteristics. Specification of the required magnet types and quantities including magnet field quality specifications.</p>	44
<p>D-2.6: Preliminary collimation system design concept and performance estimate Description of the collimation system baseline design including a list of beam-line elements (type, description, quantity, physical element characteristics). Description of the assumptions, requirements and constraints on the infrastructure and services. Summary of the expected performance.</p>	45



Annual workshops (all WPs)

Semi-annual workshops (WP2) + remote connections to keep the work on

