

# LHeC QCE Group CDR preparation status 12 nov 2010

Topic	Authors	# Pages	Study status	CDR subarticle status	Chavanne talk
1. Inclusive ep cross sections and structure functions	Max Klein, Enrico Tassi	10	<b>Finished</b>	<b>Ongoing writing</b>	<b>yes</b>
2. QCD fits (PDF & $\alpha_s$ )	Claire Gwenlan, Alberto Guffanti, Max Klein Thomas Kluge, Voica Radescu	7+4	<b>Mostly finished</b>	<b>Ongoing writing</b>	<b>yes</b>
3. Electroweak physics	Paolo Gambino, Claire Gwenlan, Nandi Soumitra, Voica Radescu	5	<b>Mos</b>	<b>Ongoing writing</b>	<b>yes</b>
4. Single top production	<b>Vacant</b>	4	<b>Generator level studies, Sherpa plus Det. simulation??</b>		
5. Charm and beauty production	Gustav Kramer, Hubert Spiesberger, Gokhan Unel, O. B.	11	<b>Finished</b>	<b>Delivered 1<sup>st</sup> draft</b>	<b>yes</b>
6 High pt jets	Thomas Gehrmann, Claudia Glasman, Juan Terron, Thomas Schoerner, Joerg Behr	8	<b>Finished</b>	<b>Delivered 1<sup>st</sup> draft</b>	<b>yes</b>

# Summary

The LHeC has potential to completely unfold the partonic content of the proton: u,d, c,s, t,b for the first time and in an unprecedented kinematic range. This is based on inclusive NC, CC cross sections complemented by heavy quark identification.

Puzzles as u/d at large x or a strange-antistrange asymmetry will be solved.

Precision measurements are possible of  $xg$  (up to large x) and the beauty density which are of particular relevance for the LHC. The (almost) whole p structure which the LHC assumes to know will become accurately known.

Determination of fundamental SM constants: light quark axial and vector couplings to Z boson, W propagator mass, strong coupling constant  $\alpha_s$  with permille level precision

A wealth of precision QCD tests can be performed with final states:

- High pt jets (higher orders,  $\alpha_s$ , proton and  $\gamma$  structure)
- Heavy flavours (mass treatment in pQCD expansion)
- Prompt photons and other identified particles (pQCD x QED tests, fragmentation studies)