

Physics 125 Problem Set 8

Harry Nelson

due Friday, June 5 in class
Final is Tuesday, June 9, noon

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1. Derive the root-mean-square of the number of events predicted by the Poisson distribution:

$$P(n) = \frac{\langle n \rangle^n}{n!} e^{-\langle n \rangle},$$

where, as you know, $\langle n \rangle$ is the mean number of events.

2. At the LHC, the predicted luminosity is $10^{34} \text{ cm}^{-2}\text{s}^{-1}$. Interesting cross sections have the size of about a femtobarn, where femto means 10^{-15} , and 1 barn is 10^{-24} cm^2 . How many interesting events per day do you expect at the LHC?
 3. Griffiths 6.6
 4. Griffiths 6.8
 5. Griffiths 6.9
 6. Griffiths 6.11
 7. Griffiths 6.14
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