

PHY983 - Nuclear Astrophysics - Spring 2013

Homework set 2

Due: Friday, Jan 25, 2013, at beginning of class

Keywords: solar abundances

1. [5pts] Explain why abundances in Lodders ApJ591 (2003) 1220 listed in Table 1 and Table 2 are different. Explain what the different numbers are and what the physical reason for their difference is.
2. [5pts] Create an electronic abundance table for recommended proto solar abundances based on Grevesse et al. *Astrophys. Space Sci* 328 (2010) 179. You can use Lodders ApJ591 (2003) 1220 as guidance to whether to use meteoritic or photospheric data in each case. Create the table in text format, blank separated. Each line should contain Z, abundance, and error (see Lodders table on the class website as a sample of the format). E-mail the table to schatz@nsl.msu.edu.
3. [5 pts] Create a difference plot with the Lodders 2003 abundances posted on the website. Try to make a good, professional looking graph where one sees how big the differences are and whether they are significant taking into account the error bars (plot the difference and the error of the difference as an error bar. Calculate the error of the difference by propagating the individual error of the abundances). Write down what you conclude from the comparison (where there changes? Are they significant?)
4. [5pts] Use the K. Lodders ApJ591 (2003) 1220 paper to calculate the total mass of platinum (in grams) currently in the solar system.