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| **Project Plan Cover Sheet and**  **Feedback Form**  Third Year Physics Laboratory | **Student’s Name – *PRINT***  **NELSON TALUKDER** | |
| **Date**  **25th January 2018** | **Project Code** |
| **Title**  **Analysis of HMF data from the Juno Spacecraft** | |
| *To be completed for all Projects. Formative assessment only.* ***No grades provided but 5% deducted from final mark if not submitted*** | **Partners Name (if applicable) – *PRINT*** | |

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| This project aims to analyse data from the Juno Spacecraft to measure changes in the Heliospheric Magnetic Field (HMF) between 2011 and 2016. The data used is in the form of the magnetic vectors, measured between 1 and 5 AU from the Sun. Something else to take into account is the varying distance of Jupiter from the Sun.  The main focus will be on the time and variation in radial distance from the Sun. Data from the ecliptic plane will be considered meaning the HMF can be approximated to be solely a function of distance from the Sun and time. An additional approximation assumes the radial component of HMF is proportional to the inverse square of the distance. Data from different locations can therefore be compared by multiplying each result by its square distance from the Sun, R2.  The first task will generate plots of the variation in the radial HMF ∙ R2 as a function of time, in units of decimal day. The radial component of the magnitude will be found from projecting the magnitude of the x, y and z components of the HMF onto the normalized radial distance from the Sun.  The next task will be to get data from the ACE spacecraft over the same time period. Overlaying the data with the Juno plot will verify the time variation in radial magnitude. It is expected they should be similar.  Juno travelled from Earth to Jupiter and so followed the same radial path as Ulysses. Comparing this data should give some indication of the radial decrease in magnitude. The hypothesis of a long-term decrease in the HMF can be tested to see if there has been a significant decrease in Solar activity since Ulysses started recording data in 1990.  A final test will be to take daily and hourly averages of the HMF. This will provide an analysis of small changes in the HMF. A timescale of period of solar rotation, around 27 days, will provide evidence for the effect of Solar rotation on the HMF. |

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| Supervisor:  Dr Robert Forsyth |  | |
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