## Homework 4

- 4.1 : A 100% linearly polarized interstellar source is 3 kpc away. The average electron density in the direction of this source is 0.03 cm<sup>-3</sup>. The magnetic filed along the line-of-sight direction, B<sub>parallel</sub> is 3 micro Gauss. What is the change in the angle of polarization at 100 MHz, and at 1GHz, respectively?
- 4.2 : If the DM for a given pulsar is 50, and the value or RM is 1.2 ×10<sup>2</sup>, what is the value of the line-ofsight magnetic filed? If the magnetic filed perpendicular to the line of sight has the same strength, what is the total magnetic filed?
- 4.3 : Over the whole world, there have been (on average) 60 radio telescopes of (average) diameter 25 m operating since 1960. Assume that the average power received by each is 10<sup>-16</sup> W over this period of time, what amount of energy has been received in total during this period of time? Compare this to the energy released by the falling of an ash (taken to be 1 g) from a cigarette held in your hand into an ashtray, a distance of 2 cm, in the earth's gravity.