

SP352 HW #4

MP = “Multipole Expansions” handout (with problems on pages 32 to 43)

due Tuesday 12 February by 1200:

- (a) MP #1—Skip part *e* if you already did it in part *d*.
- (b) MP #8—Add part *e*: What is V on the x -axis? on the y -axis? on the z -axis? Physically, why does V have these values on the axes?
- (c) MP #13—In part *c*, also calculate Q_{xz} and Q_{yz} . Hints: In part *e*, we are already given the off-center case, so you only need to figure out the on-center arrangements. (Note that the “off-center quadrupole” actually turns out to be on-center!) In part *f*, you better get the SAME answers that you got in parts *c* and *d*!
- (d) MP #4
- (e) MP #5—Express your final answer in part *d* in terms of $P_2(\cos\theta)$.