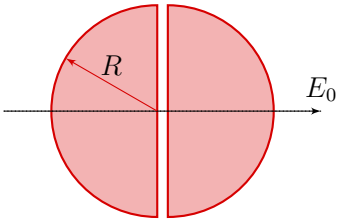
Reply hazy, try again.
Magic 8 Ball!

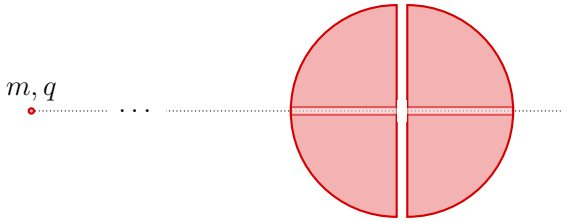
Cut

An uncharged conducting ball of radius R was cut in half along its diameter and its halves were moved apart at a distance $h \ll R$, after which they were placed in a uniform field $\vec{E}_0$ perpendicular to the plane of the cut.



1. *(2 points)* Find the charge distribution law on the conductor's surface.
2. *(3 points)* Find the strength of the hemispheres' interaction with each other.

The external field was turned off, and the ball was replaced with a dielectric one keeping the distribution of the charge over the surface of the ball found in 1. A narrow rectilinear channel was made in the ball passing through the center of the ball and perpendicular to the plane of the cut. A point charge q of mass m is located at a large distance along the channel axis, as shown in the figure. The charge is released, and it begins to move towards the center of the ball.



1. *(1 point)* Find the speed of the charge v_1 at the center of the ball.
2. *(1,5 points)* Find the speed of the charge v_2 at the distance $r_1 = \dfrac{R}{3}$ from the ball center.
3. *(2,5 points)* Find the speed of the charge v_3 at the distance $r_2 = 100R$ from the ball center.

The influence of the charge field on the distribution of charges on the surface of the hemispheres can be neglected. The dielectric ball is fixed.

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First hint — 17.05.2021 14:00 (GMT+3)
Second hint — 19.05.2021 14:00 (GMT+3)

End of the third tour — 21.05.2021 22:00 (GMT+3)