

## Question #265

The rope wave generator in the photograph below consists of a rope attached at one end to a vibrator with the other end running over a pulley with 1000 grams of weight attached. When the vibrator is activated, a one loop standing wave is produced, as shown in an mpeg video by clicking your mouse on the photograph.



If the video goes too fast for you, click [here](#) to see it at a reduced speed. Note that the string vibrates four times (the sound of the rope wave generator) for each tick of the metronome.

For this video, the metronome is set to 160 ticks per minute, and there are four vibrations of the wave generator per metronome tick, so the frequency of the wave generator is 640 vibrations per minute.

Suppose that the tension in the rope is decreased by a factor of 2 by replacing the 1000 gram weight with a 500 gram weight. How must you change the frequency so that a single loop standing wave will result?

To obtain the new frequency the old frequency must be:

- (a) decreased by a factor of 2.
- (b) decreased by a factor of the square root of 2.
- (c) remain the same in this case.
- (d) increased by a factor of the square root of 2.
- (e) increased by a factor of 2.
- (f) other.

Click here for [Answer #265](#) after December 4, 2006.

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[Question of the Week](#)

[Outreach Index Page](#)

[Lecture-Demonstration Home Page](#)



For questions and comments regarding the *Question of the Week* contact [Dr. Richard E. Berg](#) by e-mail or using phone number or regular mail address given on the [Lecture-Demonstration Home Page](#).