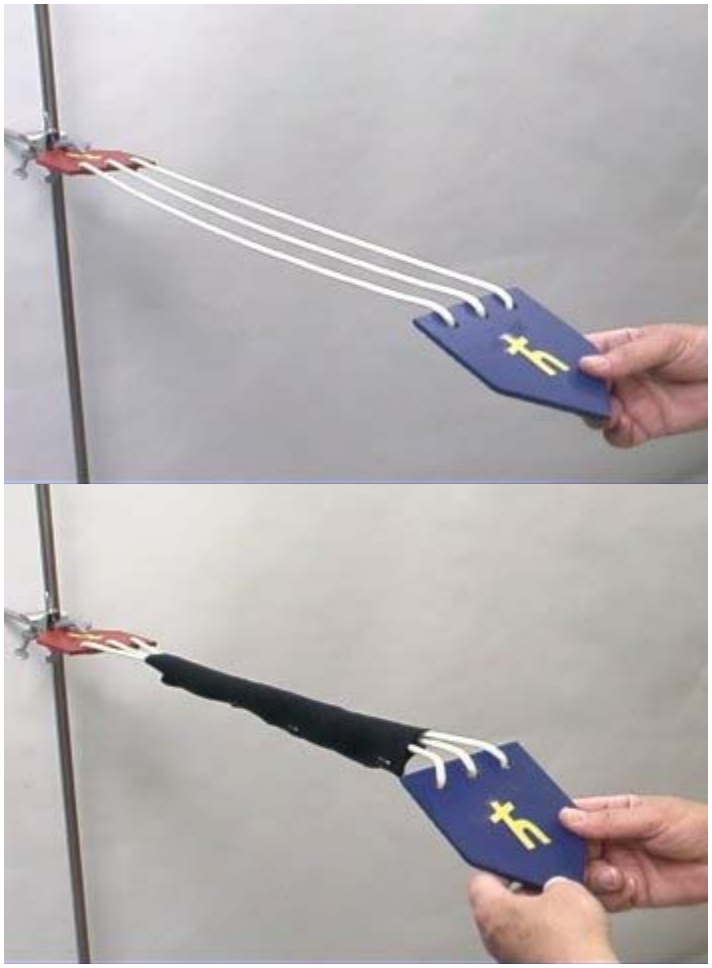
Question #269

The strange setup in the photograph at the left below consists of two unusual ends that look a lot like quantum mechanical "bracket" symbols, with three lengths of rope running in parallel between the two brackets. The symbol h-bar has been placed on each of the brackets because this demonstration might have something to do with small objects.



In the figure at the right the three ropes have been covered by an opaque material so that how they are (or are not) twisted cannot be seen.

Now suppose that I hold the ropes near their center with my left hand, lift the ropes up slightly, move the closer bracket (in my right hand) toward the other, above the closer length of ropes, under the far length of ropes and finally back away from the other bracket so that the ropes are again tight. In case you did not quite understand this, click on the photograph at the right to see an mpeg video of the action. The situation in the photograph at the left above is what we will call "untangled."

When this "transformation" is produced, the question is what it might take to undo the transformation so that the ropes are back in their original "untangled" configuration, parallel to each other, and not twisted, tangled, or otherwise knotted or contorted.

After performing the above action, to assure that the ropes are in their "untangled" configuration you must:

- (a) rotate the nearby bracket two turns clockwise.
- (b) rotate the nearby bracket one turn clockwise.
- (c) rotate the nearby bracket one turn counterclockwise.
- (d) rotate the nearby bracket two turns counterclockwise.
- (e) do nothing; they remain untangled after the original action.
- (f) They cannot be untangled by any simple rotation of the bracket.

Click here for Answer #269 after January 15, 2007.

Question of the Week

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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.