



Frost Barbs

In the American Association of Physics Teachers' annual High School Physics Photo Contest, students worldwide are invited to submit an original photograph, together with an essay describing the physics in it. This photo, by Paige Rosemary Frankl in Whitney Mernitz's class at Cherry Creek High School in Greenwood Village, Colorado, was the runner-up in this year's "Natural" category. This caption accompanied the photo:

This image captures a rare frost formation on wires. If a solid surface is colder than freezing, and also below the temperature at which the surrounding air is saturated with water vapor, then water vapor is deposited on the surface as ice crystals without going through the liquid phase. This is frost. The specific type of frost pictured is an example of advection or wind frost that forms when a very cold wind blows over branches of trees, poles, or other surfaces. The size of frost crystals varies depending on the time they have been building up, the amount of water vapor available, and the type of surface. In the picture, different amounts of frost have built up on the different kinds of wire. The bases of almost all of the ice crystals start on the right side of the wire. The crystals of ice then extend towards the direction of the cold wind that is bringing water vapor into the area, just as any crystal begins at its base and extends outward from it to the source of the "mineral" (here, water vapor) that is forming the crystal. Thus, in the perspective of this picture, the wind is blowing from right to left.

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