

A colorful relativity problem

The cover of the January 2005 issue of PHYSICS TODAY is supposed to depict what the market square at Tübingen would look like if you were approaching it at 90% the speed of light. Off-hand, I'm not sure this is what the square would look like at that speed, but I am sure the colors would be different. All wavelengths would be shorter by more than a factor of two. So, unless that little octagonal pond is actually red, you've got a problem with your relativity.

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Editor's note: We invited Marc Borchers, who supplied the cover image, to comment.

Borchers comments: The image on the PHYSICS TODAY cover depicts the geometric distortion only, so it is not

what one would actually see when falling at 90% the speed of light. In addition to the shift in colors due to the Doppler effect, the appearance would be dominated by the searchlight effect. When looking in the direction of motion at 90%, the wavelengths would be shorter by a factor of 4.35, while the intensity would increase by a factor of more than 1500 (Doppler factor to the fifth power); the exact value depends on the spectral distribution in the infrared. To accurately render the color distortion, we would need the spectral distribution of the scene in the infrared. Unfortunately, we don't know this distribution for the market square.

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