

# Michelson-Morley explained

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## Abstract

Short and popularized version of the famous experiments called MMX. We can see that in reality it is Michelson's – not Potier's version that is the correct one.

## The equipment

A light source produced wave fronts that was split up by a beam splitter to move in 2 different directions. They were both reflected by perpendicular mirrors and reflected back. Then they were combined into the same space again. There the 2 wave fronts were illuminating the same detector surface and therefore could produce an interference pattern.

## The prediction

In the **longitudinal** arm a small reduction of 2-way light speed was expected to be observable due to a slight reduction in the distance traveled of one wave front. That means a distance effect of second order. The orientations of the wave fronts are **not** changed by ether wind inside the wave fronts.

In the **transverse** arm Potier introduced the idea that light should have to take a longer way – in a triangular path – and therefore produce an effect that was half the effect in longitudinal arm. This idea was a serious mistake. The motion of the mirror has no effect, since another point on the mirror will be perpendicular, and only shifted about 10 micrometers. The motion of the detector also becomes irrelevant by other reasons and shifted about 20 micrometers. Although a first order effect is present in the longitudinal arm due to detector motion this effect will be a tangential effect – or a translation of one field. That means a motion **inside** the wave front, and interferometers are blind in 2 tangential directions and sensitive in one dimension only. So, instead of light taking a longer way another part of the wave front will hit the detector. So, no effect in the transverse arm – Potier was wrong.

## The result

The misunderstandings regarding MMX seems to have contributed to the acceptance of the Lorentz transform and the concept of time dilation. With the correct interpretation we have arguments for Galilean transform and **no time dilation**.

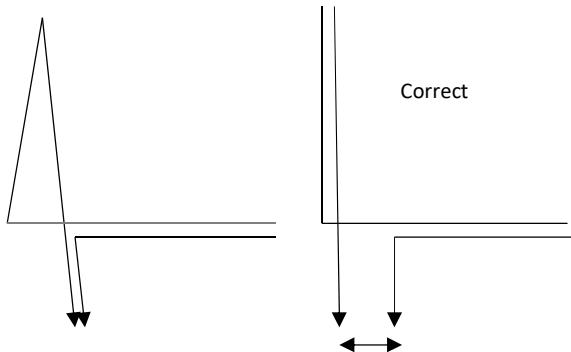


Fig 1 Interpretations of Michelson and Morley's tests