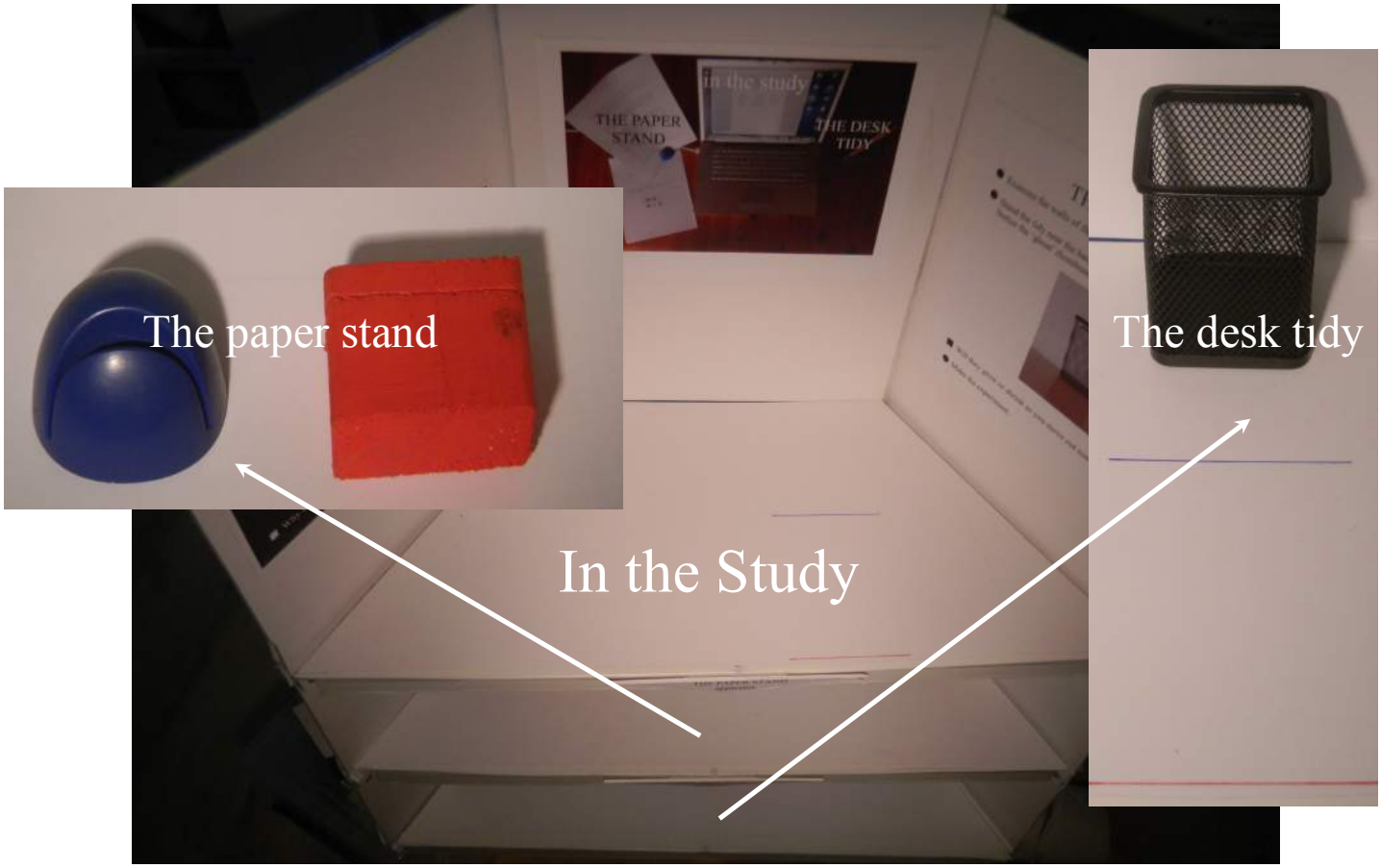
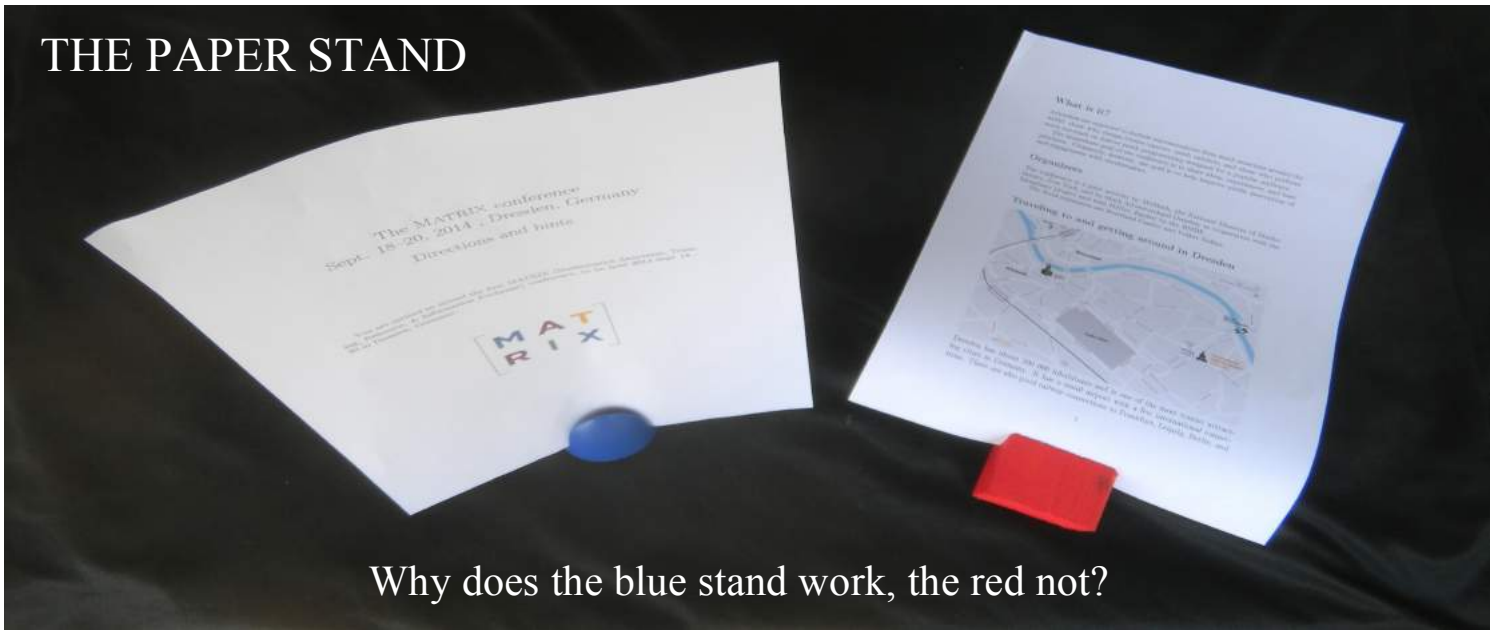

THE PAPER STAND
in the study
THE DESK TIDY
The paper stand
The desk tidy
In the Study


THE PAPER STAND
The MATRIX conference
Sept. 18.-20. 2014 : Dresden, Germany
Directions and hints
MAT
RIX
What is it?
Organizers
Travelling to and getting around in Dresden
Why does the blue stand work, the red not?

Notes

The blue stand imposes on the sheet a plane of principal curvature. To flop back, as it does in the red stand, it would have to bend in a second plane at the points where it emerges from the stand. But, since the sheet is of paper, not rubber, it can only conform to a surface which rolls out flat, a *developable* surface. This geometry allows only one plane of principal curvature, perpendicular to which straight lines run through the sheet, i.e. it is a *ruled* surface. All developable surfaces are ruled, (though the converse is false).

THE DESK TIDY

Examine the walls of the desk tidy. Notice the rhombuses.

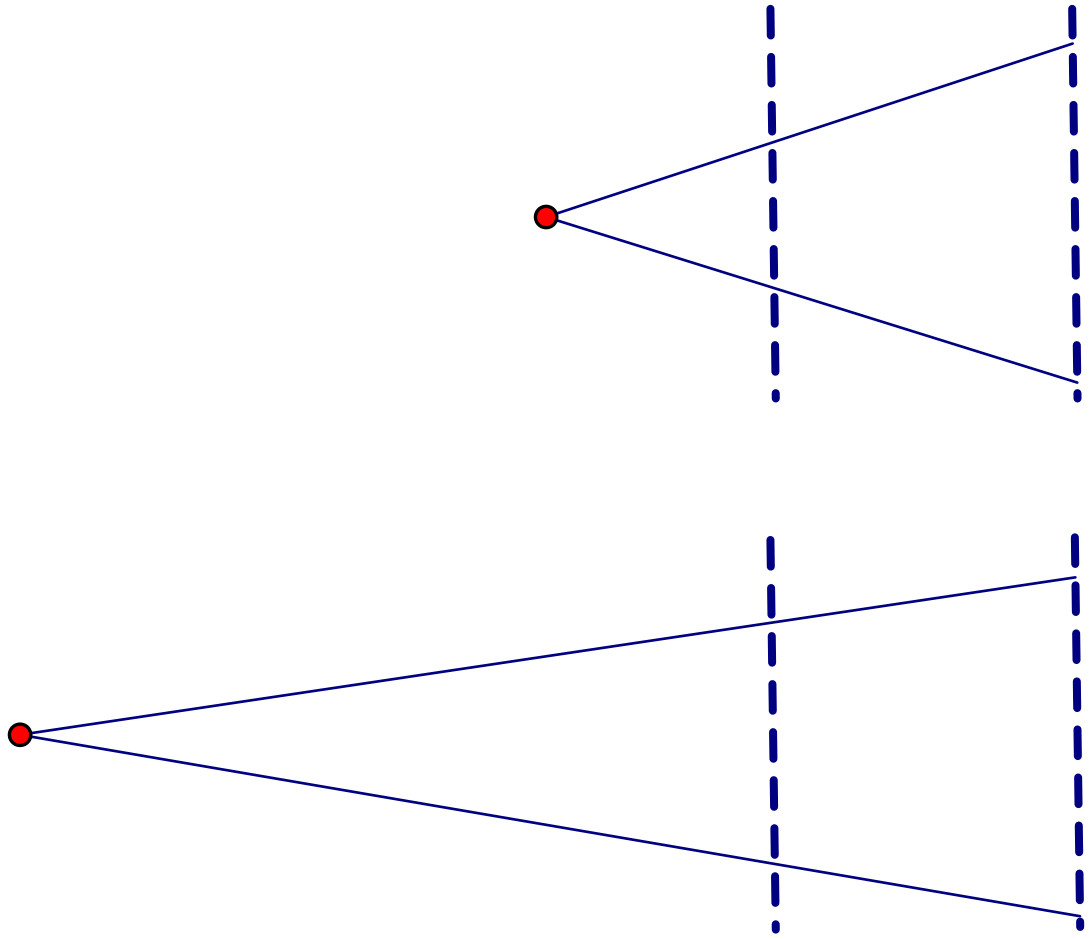
Stand the tidy near the back wall and look from the blue line.
Notice the ‘ghost’ rhombuses.

Will they grow or shrink as you move out towards the red line?

Make the experiment.

Notes

The phenomenon here is called a Moiré effect. Moiré effects are caused by phase differences between a pattern and the same pattern, shrunk or twisted, superimposed on the original. In our case the shrinking is achieved by parallax. The tiling of rhombuses in the back wall of the tidy subtends a smaller angle at the eye than that at the front. The upper profile below shows the case where *k* rhombuses at the back fit the space of *l* at the front. If *k* and l are coprime, counting in terms of back rhombuses, the two sets come into phase every *kl.* In the lower profile, *k* back rhombuses coincide with a greater number, *m,* of front rhombuses. $km > kl$, so the 'ghost' rhombuses in the second case are (fewer and) bigger.



For the provisional draft of of a morning workshop on the subject for 13-14-year-olds, to be given first 27.9.14, e-mail me at the address below.