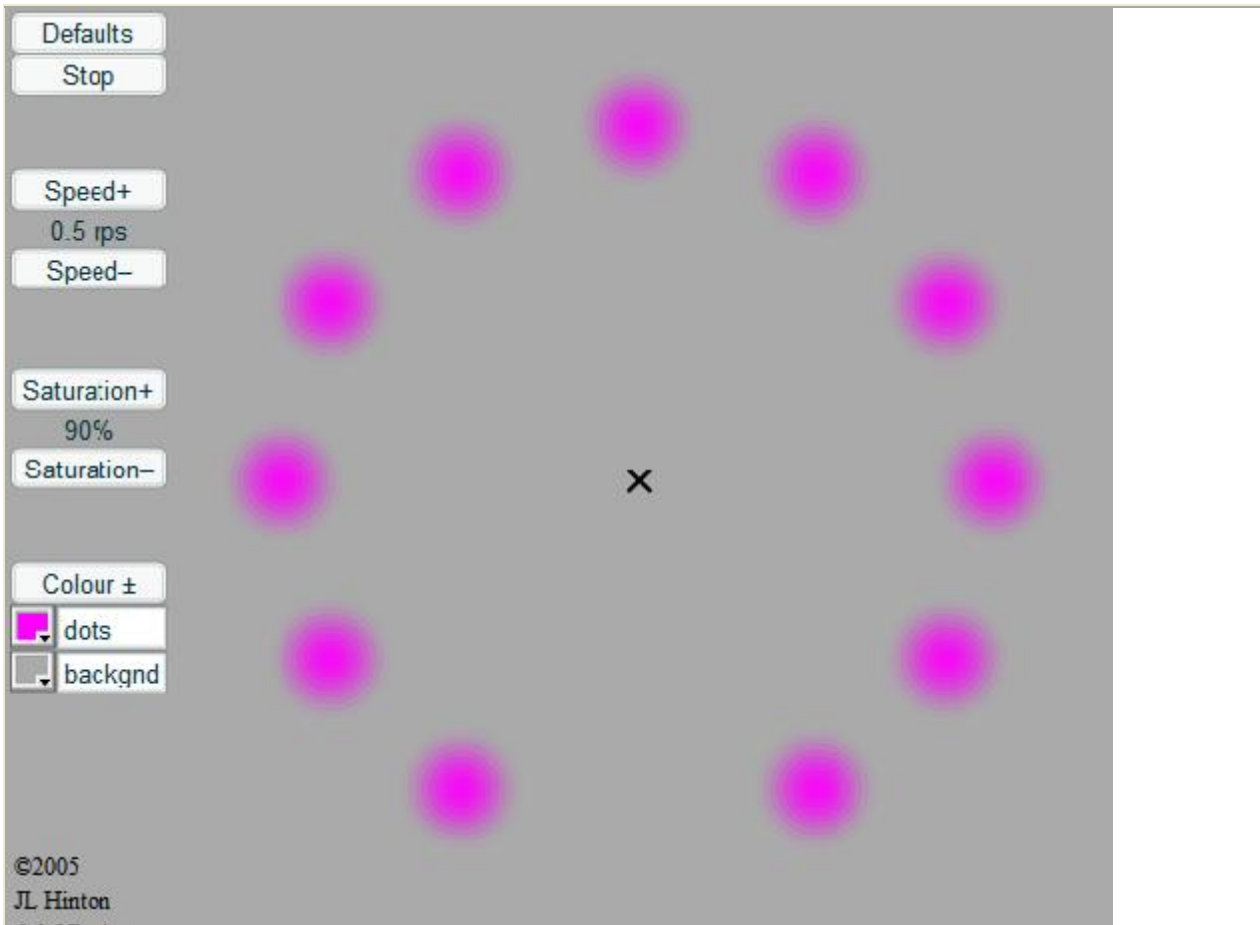


# “Lilac Chaser”

From Michael’s “Optical Illusions & Visual Phenomena”



## *What to see*

Above you see a circle of blue-violettish (=magenta) patches, one of which briefly disappears, circling around.

Let your gaze rest on the central fixation cross, but observe with your “inner eye” the patches just when they disappear. With good fixation, you should see a strong greenish colour whenever the violet patch has disappeared.

When you are fixating well, after a few cycles you will actually see a rotating green spot! If your gaze is really steady, the magenta patches will disappear, leaving only a rotating green spot (this is easier if you reduce saturation to, e.g.,  $\approx 20\%$ ); when you then make any eye movements the circle reappears.

With the “Colour±” button you can switch to other colours and observe the respective opponent colour. [Remember to fixate for a while because the adaptation to the previous colour subsists for several seconds.] It may surprise you

that the complementary colour to red is not green (as mentioned in many textbooks), but blue-green. The color pickers further down let you explore the full range of colours, including the effect of the background colour.

### *Comment*

The temporal presentation enhances the well-known afterimage in complementary colour.

Jeremy Hinton, the ‘inventor’, writes: “The illusion illustrates Troxler fading, complementary colours, negative after-effects, and is capable of showing colours outside the display gamut.”

I have been repeatedly asked to explain this in more detail, so here goes:

1. There is something called the “**negative retinal afterimage**”. It becomes visible when one given hue stays on the same retinal position for several seconds (usually we would move our eyes typically 3 times per second, so this is no disadvantage in normal viewing). The afterimage builds up as that retinal location adapts to this special hue, and when looking at a neutral background the complementary colour is seen.
2. This is a good thing, normally, because it helps “colour constancy”, that is we see colours somewhat independent of the ambient illumination (compare the bluish glacier noon sun with a reddish tint in the evening living room by the fireside).
3. Ok, so the afterimage is “burnt in”, meaning: that retinal location is adapted. Now the magenta patch is suddenly switched to grey. Because of the adaptation, the complementary colour is now seen, which would be green for magenta, or light grey for a dark grey.
4. The retinal afterimage typically fades away rapidly (over a few seconds under normal conditions). But here this fade-out does not reduce the perception of the afterimage, because a new one is uncovered right after at the next location.
5. In addition, a Gestalt effect, here the “phi phenomenon” comes into play: the afterimage from the successive retinal locations is integrated and perceived as one single moving object, namely the green disk.
6. In summary, the following factors make this illusion rather compelling:
  - it is rather easy to steadily fixate on the centre
  - most of the time the retinal locations are re-adapted and the afterimage is uncovered only briefly
  - a Gestalt effect leads to the perception of a flying green disk.

### *Source*

Jeremy L Hinton (2005-05-22, personal communication, jeremy dot hinton at bigfoot dot com)

Robert O’Shea wrote a pertinent [Wikipedia entry](#)