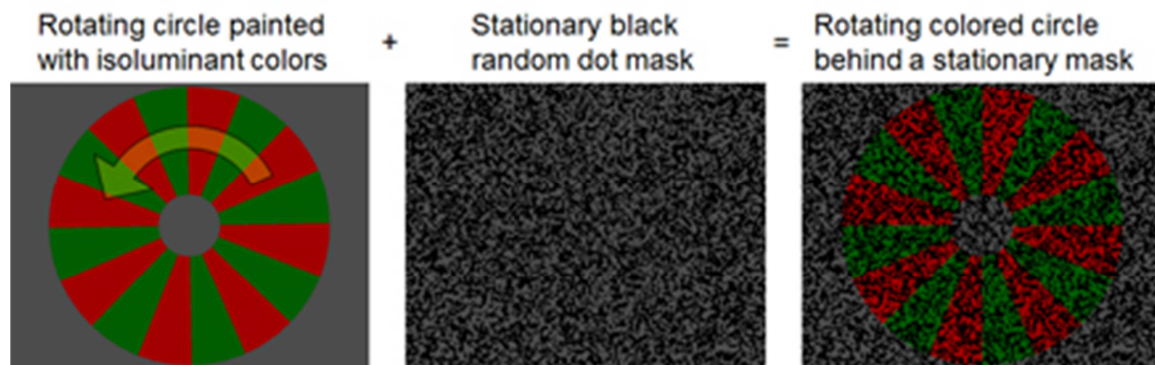


# Color Rotation and Expansion/Contraction Standstill

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The term „[color rotation standstill](#)“ refers to a new illusion display: a slowly rotating color wheel with alternating sectors painted in isoluminant green and red is perceived as standing still in the presence of a stationary transparent random dot mask, when fixating the center of the wheel. When fixating the border between adjacent sectors, one perceives clearly local motion, while looking back at the center stops the wheel appears as standing still.



The term “[color expansion and contraction standstill](#)” refers to a similar illusion. Rings painted in alternating isoluminant red and green are expanding or contracting by changing the scale of the rings. When a transparent random dot mask is added to the display, the rings appear not to change in size despite their scale is changing by about 50%. Here again, one perceives outward or inward motion of a ring segment when fixating near the periphery.

The strength of both color standstill illusions critically depends on the isoluminance of the green and red elements. Inserting contours between green and red elements, or increasing the rotation or the contraction/expansion above some threshold speeds abolishes the illusion. The most dramatic effect can be seen when switching off the random dots. Rotation of the random dot pattern alone over a non-rotating color wheel is mostly perceived as rotation of both, the random dots and the color wheel (“**pseudo rotation**”).

The group of Lu and Sperling coined the term “Standstill” for moving color grating, which were perceived as standing still at isoluminance and equal “distinctiveness” of the colors used (isosaliency). They also described standstill illusions for actually moving stereo gratings at particular temporal and spatial frequencies. However in the illusions shown here, only the perception of complex motions (rotation, expansion/contraction and presumably also spiral motion) is affected, and not the perception of local motion. It seems that the luminance system dominates in the perception of complex motion, when there is a conflict between the color and the luminance inputs. Similarly, the luminance system seems also to dominate when it conflicts with the stereoscopic input, as exemplified in the [stereo rotation standstill](#) illusion.

Z-L. Lu, L. A. Lesmes and G. Sperling (1999) Perceptual motion standstill in rapidly moving chromatic displays. PNAS 96, 15374-15379.  
Tseng C-H, Gobell JL, Lu Z-L & Sperling G. (2006) When motion appears stopped: Stereo motion standstill. PNAS 103, 14953-14958.  
Stereo rotation standstill(2008) Max Dürsteler <http://illusioncontest.neuralcorrelate.com/tag/stereo/>

The “color rotation standstill” and the “color expansion/contraction standstill” demonstrations were implemented as interactive Silverlight 4 web applications running on MAC OS X, Windows and with Moonlight on Linux. By clicking on the “install” button the applications can be downloaded and installed as personal “out of the browser” applications (see <http://www.microsoft.com/silverlight/out-of-browser/> for more details).

**Color rotation standstill** <http://www.untere-weinegg.ch/ColorStandStill/>

**Color expansion/contraction standstill** <http://www.untere-weinegg.ch/ColorExpansionStandStill/>