In Harvard’s high-tech cleanroom, applied physicists produce vivid optical effects—on paper. One is a metamaterial that absorbs 99.75 percent of infrared light—very useful for thermal imaging devices. Another is an ultrathin, flat lens that focuses light without imparting the distortions of conventional lenses. And the team has produced vortex beams, light beams that resemble a corkscrew, that could help communications companies transmit more data over limited bandwidth. Certainly the most colorful advance to emerge from the Capasso lab, however, is a technique that coats a metallic object with an extremely thin layer of semiconductor, just a few nanometers thick. Although the semiconductor is a steely gray color, the object ends up shining in vibrant hues. That's because the coating exploits interference effects in the thin films; Kats compares it to the iridescent rainbows that are visible when oil floats on water. Carefully tuned in the laboratory, these coatings can produce a bright, solid pink—or, say, a vivid blue—using the same two metals, applied with only a few atoms' difference in thickness.

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