

Title: "Beyond Kepler: Direct Imaging of Exoplanets"

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Abstract:

The exoplanets field has been revolutionizing astronomy over the past 20+ years and shows no signs of stopping. The next big wave of exoplanet science may come from direct imaging of exoplanets. Several (non-habitable) exoplanets have already been imaged from the ground and NASA is planning an instrument for its 2020s flagship mission (WFIRST) to directly image large exoplanets. One of the key goals of the field is the detection and characterization of "Earth 2.0", i.e. a rocky planet with an atmosphere capable of supporting life. This appears possible with several potential instruments in the late 2020s such as WFIRST with a starshade, Extremely Large Telescopes (ELTs) from the ground, or one of NASA possible flagship missions in the 2030s (HabEx or LUVOIR). Also, if an Earth-like planet exists around Alpha Centauri (A or B), it may be possible to directly image it in the next ~5 years with a small space mission such as the Alpha Centauri Exoplanet Satellite (ACESat). I will describe the current challenges and opportunities in this exciting field, as well as the work we are doing at the Exoplanet Technologies group to enable this exciting science.

Bio:

Ruslan Belikov holds a BSE from Princeton, a Ph.D. from Stanford, and has over 10 years of experience in developing technologies and mission concepts to directly image exoplanets, especially potentially habitable ones. He is currently leading (together with Eduardo Bendek) the Exoplanet Technologies research group at NASA Ames, which has demonstrated several state of the art milestones in high contrast imaging. In addition, Belikov and his team have been pioneering and advancing technologies to suppress starlight in multi-star systems such as Alpha Centauri to enable direct imaging of exoplanets there. In 2014, Belikov and Bendek led a small Explorer mission proposal to NASA called Alpha Centauri Exoplanet Satellite (ACESat) to directly image potentially habitable planets around Alpha Centauri with a very small low-cost telescope. This work has been covered or mentioned by many media outlets including the Scientific American, NYtimes, Huffington Post, and others. Belikov is also part of the coronagraph instrument team for the WFIRST mission and was a member of the Exoplanet Program Analysis Group (ExoPAG) executive committee.