**Título:** "EXTREME ADAPTIVE OPTICS SYSTEM OPTIMIZATION FOR HIGH CONTRAST IMAGING WITH THE HIGH ORDER TEST BENCH"

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**Fecha de lectura:** 20/06/2011

**Mención a doctor europeo:** concedido

**Programa de doctorado:** Astrofísica y Cosmología

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**Descriptores:**

> VALIDACION DEL TEST

> ASTRONOMIA Y ASTROFISICA

**El fichero de tesis** no ha sido incorporado al sistema.

**Resumen:** Direct detection of extrasolar planets is one of the most exciting but also one of the most challenging aim
of the next 20 years. High-contrast imagers dedicated to the search for extrasolar planets are currently being developed for present-day 8-10 meter telescopes (SPHERE, GPI ...) or in design phase for the next generation of Extremly Large Telescopes (EPICS).
Direct imaging of extrasolar planets requires contrast levels better than 10¿6 at a few tenths of an arcsecond from the central star. Scattered light from optical aberrations introduced by atmospheric turbulence (seeing) and the diffraction pattern of the telescope apertures limit this contrast by masking the faint planet with light from the star. To achieve the required contrast it is necessary to implement eXtreme Adaptive Optics systems (XAO) in order to work on diffraction limit and coronagraphs to suppress the light coming from the star. Simulations predict good performances but XAO systems still need to be proven.
The High Order Testbench, currently installed at ESO laboratories in Munich, implements an experimental

XAO system. This test bench is the first to incorporate simultaneously all the components of a real XAO system and simulating real telescope conditions using a turbulence generator with phase screens. The 32x32 actuator MEMS deformable mirror, two types of wave-front sensors (Shack-Hartmann and pyramid) using the essentially read-noise free EMCCD, and the ESOSPARTAreal-time-computer (RTC) provide an ideal testbed to study XAO implementation.
The aim of this work is to study and characterized the different components of an XAO system confirming expected performance. In addition several experiments were carried out, including coronagraph characterization with real XAO conditions and high contrast techniques.