



# carmenes

## wa'Dlch successful waH chu' yuQ wamwl' "carmenes"

waH "-chal" wa'Dlch successfully juS carmenes, outstanding novel astronomical jan chut lulajpu'bogh nej yuQ tera' rur, 'e' legh telescope. jeS tej 11 yejHaD 'eSpanya' Doylchlan 'ej jonpln je chut lulajpu'bogh chu' "yuQ tthejbe" construction je. qaSpu'DI' vagh DIS ram Qu'maj mung je, jan highly Qatlh vlyajlaw' lo' neH november legh 3.5 m telescope centro astronómico hispano-alemán, observatorio jan calar Alto, DaSum southern 'eSpanya' bogh Qap DaH bltultaH jIHvaD max-planck-nugh ((mpg)) spanish National Qul yejqv ((csic)) je almería. consists jan cha' spectrographs visible poj infrared wov vo' 'ej tugh porghDaj je. optimized batlhchaj bav Sum Hov yuQ discovery. vaj, carmenes observations ghaH potlh milestone wa' 'ach SeymoH mlchHom logh exploration-nej tera' cha'Dlch.

pong nej yuQ around outside of pat solar Hov latlh yaj chay' 'ej nuqDaq neH researchers porgh chenmoH, 'ej chaq je 'ej QuQ chaq, yln sustain offer chaH. toH, pong tu' puS cha' wa'SanID so-called exoplanets.

*"ach HochHom chaH hostile yln", Qlj prof. Andreas quirrenbach, 'lv po' exoplanet searches 'ej carmenes team ra'wl'. "vaj replH yuQ so-called m dwarfs bav. roD SoHvaD mach Hov baS temperate je SoQ bav, nuqDaq chaHvaD laH detect maH je carmenes yuQ offer."*

*"'ej HoSqu'mo' m dwarfs cooler: reH be'nl'puqDaj 'ej redder puS pemHov, HochHom Sum infrared lopno' electromagnetic spectrum, ttheD thuD unique spectrograph infrared wov Hap qach maH. teH chab carmenes ghotvam'e', ghu'vam laH lu' pagh latlh jan", chel dr. Pedro amado, 'lv spanish jlnmol ra'wl' 'ej in charge of infrared spectrograph qach tej.*

novpu' nejtaH tlq yln-poH Hov qlt yuQmey 'ej blquv DuHlvDI' 'ut je long-standing biological evolution chaw' nIS. search importance ghov, qaSlaH 600 ram poH lop je largest telescope allocated observatory. *"focus jlnmol size SoHvaD qub qaStaHvIS modern astronomy"* comments dr. jesús aceituno, observatory deputy director. *"Qo'noS carmenes Qap,, qatlh moj global reference, tera'-rur-yuQmey searches 'ej lan neH tlhop tlhegh astronomical instrumentation calar Alto"*.

direct detection exoplanets ghltlvam complicate 'ej Hov tln qaD muHlvtaHbogh muDuQ QeHDaj vo' muSHa'bogh, 'oH wej neH 500 000 000 poH brighter 'ach je SoHvaD SoQ. 'utmo' Dujvam gravitational DaqaSmoH exerted host Hov yuQ vaj tlhap tej.

*"Hov yuQmey 'ej gho figure skaters ghop Hoch latlh 'uch 'ej around DIng rur Hoch latlh", jatlh dr. ignasi ribas, 'lv in charge of carmenes ghun lop nab. "'ach tlhoy skaters wa' mach 'ej chep, loQ vIH neH ghaj latlh."*

in the case of Hov yuQmey 'ej MaQa' disparity vaj ylteb 'e' vIH Hov neH legh teH pedestrian speed puS meters per cha'Dlch, poStaHvIS zips yuQmey around 'oH je wa' per cha'Dlch 'ej vabDot Saghmo' puS saturn LUT VAGH maS rocket. 'ach 'oH slow ghotvetlhDaq Hov yuQ presence nob Ha' 'e', mo' nob 'oH wobbles Sal jatlh-tale wo' 'e' stellar spectrum doppler shifts pong tlhegh. wobbles roD pagh tlhegh shifts mach periodic yoqvaD lop spectral color Hov muHlvtaHbogh relative ghotvetlhDaq along tlhegh puS towards pagh away from observer. 'ach muHlvtaHbogh cham pe'meH HeH mach shifts je ngoD detectable carmenes. lang dr. Walter seifert, 'lv ngoy' visible spectrograph construction,; *"chenmoH jan ngaDmoH yap chenkoH mach ghotvetlhDaq Hov towards maHvaD 'ej away from maHvaD during orbital ml' laH 'aD maH marIHnIS."*

