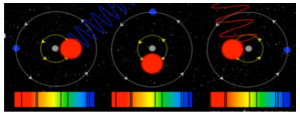
Izindlela zokukhuphulula ezingashayi khona ngqo

Ukuhlongwa kokuqala ngqa kwemizulendle kwakusebenzisa imiphumela yomdonsiswano phakathi kweNkanyezi kanye noMzulane (Bheka ikhasi elilungisana naleli), okwa vumela ukuthi kunyulwe izinsimbi eziningi ngeMzulane.

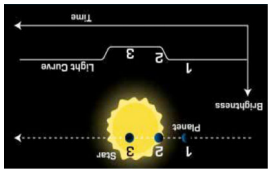
Ngezomdiki, ngokufunda ukwehluka phakathi kwesivinini esingoni seNkanyezi, sithola ubungako kanye nobuqanda bomzila wokuzungeza, isikhathi osithatha ukumpininiza kanye nomnqamulo omuncane kwisisindo soMzulane. Isisindo okuyisona kanye nokuma kwendlela yompininizo koMzulane kwenyulwa ekusululeni kweNkanyezi mayiqhathaniswa neziNkanyezi esondelene nazo (ulinganiso banga).

•Ngendlela yokudabula ubuso, sithola ubungako bomzulane ngokubuka ukujula komgungu wokukhanya ngesikhathi sokusithwa kwenkanyezi kanye nesikhathi sokumpininiza ngaphakathi kokusithwa kweNkanyezi

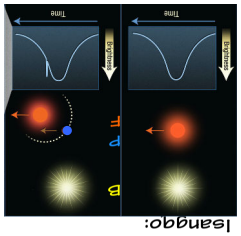
•Ngosonteko lomnyondo sithola isisindo somzulane kanye nomgamu phakathi kweNkanyezi nomzulane.



Ezomdiki : Umzulane kanye neNkanyezi bazungeza uzime. Ukubulunga kweNkanyezi ozimeni kuhlongwa ngokukhwebuka kwemnyele yayo (bheka iTUIMP yesi-2 kanye nesi-10).



Umdabulo: Uma umZulane udlula ngaphambi kwenkanyezi iyasithekela, lokhu ukusithekela kwenkanyezi.



Isangqo: Uma inkanyezi F idlula ngaphambi kwenkanyezi B, kuthi qeka 'usonteko lomunyando' olukhulisa ukukhanya, uma umzulane P uyingilza inkanyezi F, nawo uzosonta umnyondo wenkanyezi B, kodwa isikhathini esimafuphi.

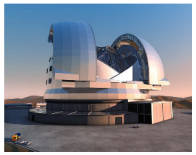
Isiyakade

Eminyakeni eyi-10 ezayo, kulindeleke ukuba izpopolo ezinobuhanzi obungama-30 kuya kobama-40 wamamitha ziyobe ziseberza lapha emhlabeni ukuhlonga imzulendle ngokutfwebula izithombe kanye nokubala ukwehluka kwezivinini zezinkanyezi. Izipopolo zaseemkhathini, okubalwa kuzo iCheops, iJWST, iPlato kanye ne-Ariel, zizonyakulwa ngenhloso yokuhlonga imzulendle ngokusebenzisa indlela yokudabula ubuso. IJWST izophinde ithwebule izithombe.

Izipopolo ezinkulu, ezinobuhanzi obulinganiselwe kwisi-8 kuya kwi-18 emamitheni (iLUVOIR, iHabex) zisaklanywa eNASA ukuze zihlonge izinkomba zempilo kwimzulendle ngowezi-2050.

Kwisiyakade, uqwanga lwezipopolo lyobala imzulendle. Mhlawumbe, izigaganeke ziyonyakuliwa kwimzulendle eseduze nelanga letfu ngenhloso yokuthwebula izithombe. Onjiniyela sebeqalile ukuseberza kwizikulukuzeli za lezi izigaganeke ukuze zifinyelele lapho.

Plato, okuyisizingeli semzulendle enkathini ezayo saseYulophu, esilindeleke ukuthi siyingilizwe ngowezi-2026. Izobukela amakhulu ezinkulungwane zezinkanyezi, ngenhloso yokubheka imzulendle ngendlela yokudabula ubuso.



Umdwebo wozonce lwezipopolo zaseYulophu ezinkulukazi, ezonce zisebenza ngowezi-2025 eTshile. Sizoqoqa ukukhanya okuphindwe ngokwe-13 uma ziqhathaniswa nezinye ezinkulukazi ezikhona siphinde sikhiqize izithombe ezinomfifiyelo ophindeke okwe-16 uma siqhathaniswa nezipopolo zeHubble.

Umdwebo woqwanga lwezipopolo ka-A Labeyrie. Izipopolo zesiyakade, uluqwanga olukhulukazi emkhathini olunoggavo olungwedo olulinganiselwe kwi-100 lamamitha, ngenhloso yokubala imzulendle.

Umlando Omafuphi ngomvubukulo

Umvubukulo wokuqala ngqa wemzulendle wenziwa lapha emhlabeni ngokusebenzisa indlela yesivinini esingoni okuyilapho khona kwakusetshenziswa isibhecamvange esasinemba. HD114762 b kwaba umzulendle wokuqala ngqa, ngowe-1989. Ngowe-1992, imzulendle emi-3 yase ikhushuliwe iyingiliza uNyazima. Emva kwalokho inani lemzulendle eyayihlongwa lavele leva. Kusukela ngowezi-2019, sekuvubukulwe imzulendle engaphezulu kwama-800 kanye nezinhlelo nkanyezi ezinemzulendle emininginezilinganiselwe kuma-600 ngokusebenzisa le ndlela.

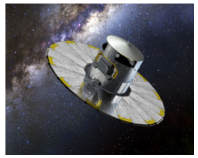
Ngowezi-2006, isipopolo zamaFulenshi, i-CoRoT yanyakulwa, kwalandela esamaMelikana i-keplar ngowezi-2009. Zombili zazisebenzisa indlela yokusitha ubuso. I-CoRoT kwaba ngesokuqala ukuhlonga umzulendle omatshe. I-Kepler isikhuphulule izinkulungwane zemzulendle.

Imzulendle eyama-90 yatholwa ngotalagu, kuthi eyi-100 yatholwa ngobuko-ngqo lapha emhlabeni.

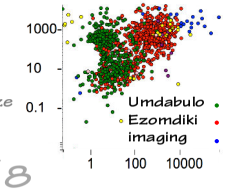
I-Gaia izosinika umlinganiso banga kanye nomdiko wezinkanyezi ezingaphezulu kwesigidimbili. Klindeleke ukuba ihlonze izinkulungwane zemzulendle emisha.

Iduna lokuzakhela iCoRoT lakhuphulula imizulendle eyama-36. Kanti ongasibe abama-600 basalinde ukuqazwa.

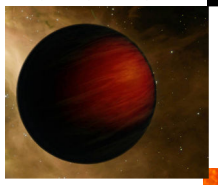
Inana lezipopolo ikepler labheka izinkanyezi eziyizinkulungwane ezingama-530, lathola ongasibe abayizi-2500 abasalinde ukuqazwa.



Iduna lase-Yulophu uGaia, la nyakulwa ngowezi-2013, lizosebenza kuze kube ngowezi-2022. Lizofunda ngeszihundla kanye neomdiki wezinkanyezi ezingaphezulu kwesigidigidi kanti futhi linomnembo ocilikishayo.

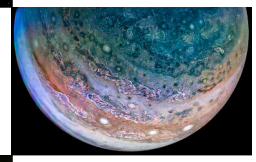


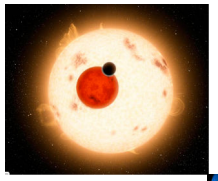
Izisindo (uma ziqhathaniswa nesomhlaba wethu) ziqhathaniswa nobude bonyaka (ngokwezinsuku zomhlaba) yayo yonke imizulendle eyaziwayo kuze kufinyelele kuNhlolanja kunyaka wezi-2019. (isangulo sicashunwe kwi-exoplanet.eu).



Imibuzo

Isiphi isithombe kulezi esikhombisa umzulane wohlelo lwelanga?





Izimpendulo zikwi overleaf

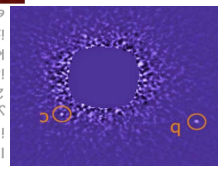
Umkhathilibe Ephakethini Lami!

Jean Schneider
Grażyna Stasińska
Paris Observatory

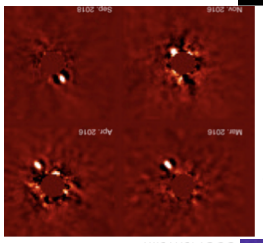
Icingwe lani ImiZulendle ?

KuneziNkanyezi cishe eziyizigidigidi eziyi-100 kuMthalakazi wethu, uMzilafasimbe. Mingaki imiZulendle - imiZulane engaphandle kohlelo lweLanga lethu - esilindele ukuba ibekhona ? Kungani ezinye iziNkanyezi zizungezwa imiZulane ? Izinhleo zamaLanga zihluke kangakanani ? Ngabe lokhu ukwehluka kusitshela into thizeni ngokudaleka kwemiZulane ? Lena eminye yemibuzo egqugquzela lolu ucwaningo lwemiZulendle.

Eminye yalemiZulane ingase ibe nezigubo ezinhle (ukukhanya okusuka kwiNkanyezi kanye nobungako bakho, amazinga okushisa, isigubo somoya) ezivumela ubukhona beKhemistry ebucayi yomcalahle kanti futhi engase ivumele ukuthuthuka kwempilo(Engase ihluke kuna leyo yasemHlabeni wethu).



imizulane emibili ezungeza iNkanyezi iHR 8799, yakhushulwa ngowezi-2008 kusetshenziswa icina kukhanya kwinsibomvu beebenzisa izipopolo iGemini North eseHawaii.



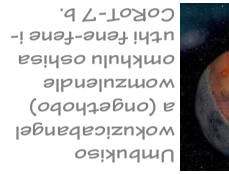
Ulando lwezithombe olathwetshulwa izipopolo iESO Very Large Telescope eChile. Likhombisa umnyakazo womzulane iBeta Pictoris b lapho ujyingiliza inkanyezi yawo.
Credit: Lagrange et al

Ieithombe sokuqala ngqa somZulendle, satwetshulwa eESO VLT ngowezi-2004. Ujyingiliza 'eiThomyana eeNgamnumwe' i-2M1207, okuyinkanyezi elumi futhi enesekhondo eencane ekhonjiswe lapha ngombala omhlophe. umchachambiso: Credit: Chauvin et al.

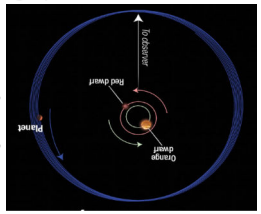
Ukuhlukahluka kweMzulendle

AKusukela ngowezi-2019, ingaphezulu kwezi-4000 imzulendle esiqinisekiswe kuthi engaphezulu kwezi-3000 isalinde ukuqinisekswa ukuthi iyiyona imzulendle. Mininginimizulane eqabqabu esikhushulwe engathokakali kuhlelo lwelanga lethu:

- Imizulane enamazinga okushisha engaphezulu kwe- 1 000 °C eyingilizza inkanyezi yayo isikhathi esiyizinsukwana ezimbalwa nje (lapho iqhathaniswa nonyaka owodwa lapha kuNomkhubulwane)
- Ehwamukayo
- Enesisindo esiphindwe kabili kunaleso sikaNomkhubulwane, ebizwa ngokuthi ononduntezulu bemzulendle, enezinkathi ezibangabanga (-100 °C ebusika, +100° C ehlobo).
- Imzulendle enamalanga amabili.
- Imzulendle esondele kakhulu elangeni yaso.



Umbukiso wokuzicabangela (ongethobo) womzulendle omkhulu oshisa uthi fene-fene i-CoRoT-7 b.



Umzulendle ikEpler-41 3b, oyingiliza izinkanyezi ezimbili: elihlala kanye nebomvu.

Izindlela zokukhuphulula ezingashayi khona ngqo

Ukuhlonga imizulandle ngqo kunzima ngoba imizulane mincane futhi iluffphi kanti futhi isondele kakhulu ezinkanyezeni zayo, ezikhanya cishe ngokuphindwe ngokwezinkulungwane eziyi-10. Ngakho-ke, sidinga ukucina ukukhanya kweNkanyezi ngokusebenzisa izicina kukhanya.

Ukuhlonga ngqo, songahle kwenzeke, kuba nemiphumela emihle, ngokuba ngezithombe ezimbalwa singawuthola wonke umzila wokuyingilizza.

Uqheshulomvange lomzulane lukhombisa isigubo somoya, isimo sezulu, kanye nommoya womzulane.

Ukwaluswa kokukhanya komzulane kusinikeza isikhathi esiwuthatha ukundiyaza, lokho kusho ukuthi, kusinika ubude bosuku kulowomzulane. Ubungako kanye nesisindo somzulane singathokakala kuphela ngezindlela ezishaya ngqo.

Umdwebo we-51 Pegasi b umzulendle omkhulu ononyaka owenziwe izinsuku ezi-4 kuphela.

Umdwebo weHD 114762 b, umzulendle wokuqala ngqa ukuthi uhlonzwe ngowe-1989.

Isithombe seNdonsa esathwetshulwa iduna lokuzakhela iJuno sase sixholwa imfundindalo eyisakhamuzi uDavid Marriott.
NASA / JPL-Caltech / SwRI / MSSS / Marriott

Umdwebo weKepler-16b, umzulendle oyingiliza izinkanyezi ezimbili.

Umkhathilibe Ephaketheni Lami No. 8

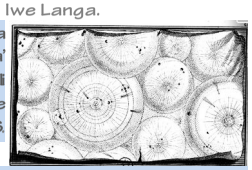
Le Ncwajana ilotshwe ngowezi-2019 ilotshwa nguJean Schneider kanye noGrażyna Stasińska baseParis Observatory (eFrance).

IsiThombe esisekhaveni: Lesi isiThombe sikhombisa umbono wokuthi imzulane ematshe ingase ibe miningi futhi ibe nokuhluka okukhulu kuMkhathilibe (umchachambiso iJPL). Zonke izithombe zemzulendle kanye namaDuna kuleNcwajana kuyimdwebo.
umchachambiso: iNASA, i-ESA kanye ne-ESO.

Ukufunda kabanzi ngalolu uchungechunge kanye nezihloko ezethulwe kuleNcwajana, sicela uvakashele u- http://www.tuimp.org

Ihumushwe: Nhlanhla Mbambo
TUIMP Creative Commons
BY NC SA

Umbono wokuthi kukhona 'eminye imihlaba' ngaphandle kohlelo lweLanga waphakanyiswa iFilosofa yaseGrikhi u-Epicure, eminyakeni eyizi-2,300 eyedlule.Ngowe-1584 iFilosofa uGiordano Bruno wazakuzisa ukuthi iziNkanyezi zingama Langa, njenga lena yethu.Ngowe-XVII kanye nowe-XVIII, osoSayensi abaningi kanye nama Filosofa, afana noCharles Huygens beno-Immanuel Kant, bawuthuthukisa wafinyelela kwimiHlaba engaphandle kohlelo lwe Langa.



Umdwebo okhombisa 'ubufuthu bemiHlaba' ngokucabanga kombhali waseFulansi uFontenelle ngowe-1686.

Uhlobo lomdwebo onomubala ocashunwe kwisifaxa esitholakala encwadini kaCamille Flammarion eyashicilelwa ngowe-1888. ukhombisa umhambuma ukhuphula omunye umhlaba.

Imizamo yokuqala yezimfundindalo zomkhathi yokuhlonza eminye imihlaba ezungeza ezinye iziNkanyezi yaba ngasekupheleni konyaka we-1930, kodwa kuze kube owe-1989 babexhaka utalagu nje.