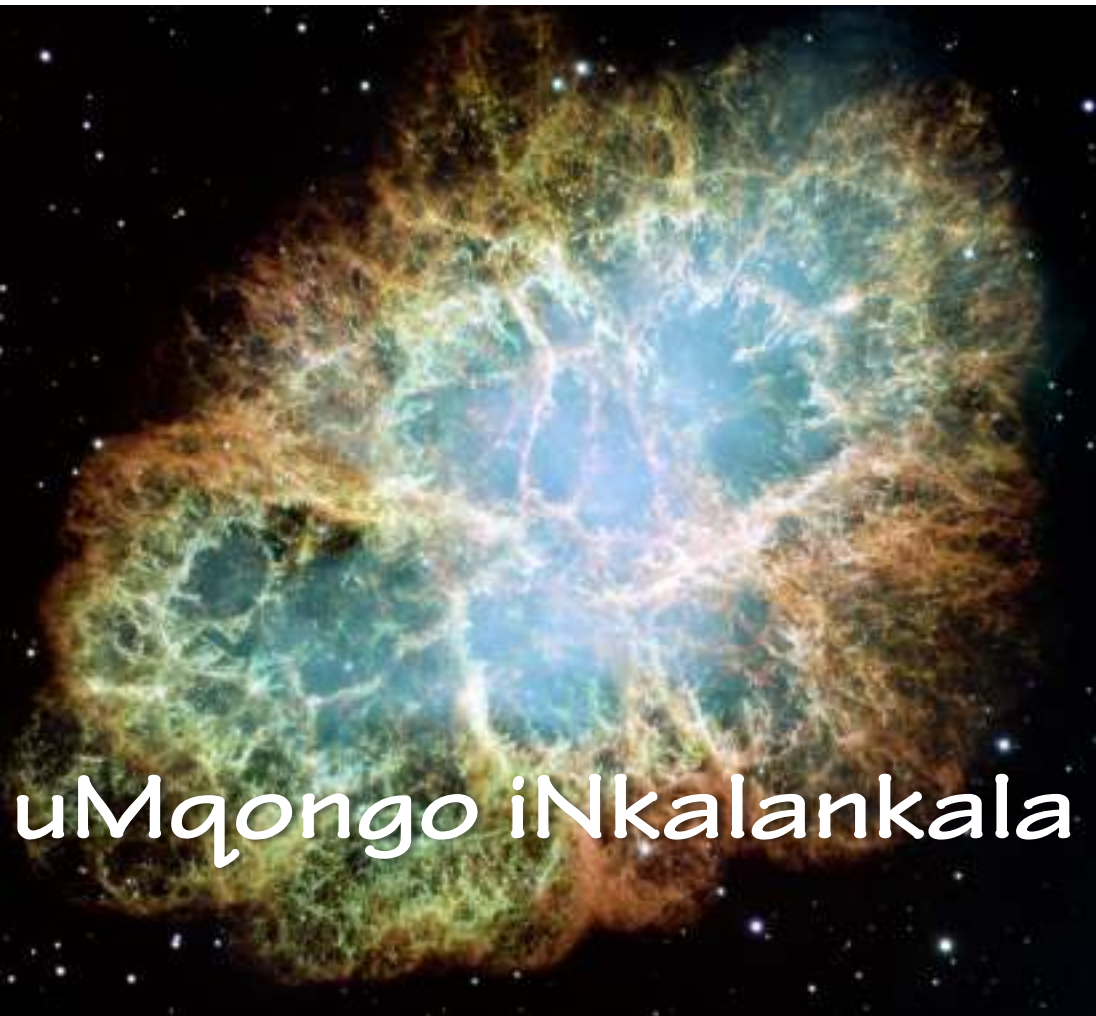


Umkhathilibe Ephaketheni Lami



uMqongo iNkalankala



Grażyna Stasińska
Paris Observatory



Umdwebo wokuqala ngqa walento kaLord Rosse ka-1844 ngendlela eyayibukeka ngayo kwizipopolo zakhe ezaziwu-90 cm ububanz. Lomdwebo uwo owadala ukuthi lento iqanjwe nge “Nkalankala” (Yize ibukeka sabhungezi thizeni).

Ngezansi: Isithombhe sokuqala somqongo iNkalankala sathwetshulwa ngu-Isaac Roberts, uzihelembhe kaGqayinyanga ophinde abe ngumakhi ongumweleshi ngo-1892 esebenzisa izipopolo eziwu-50cm ububanzi

Lesi isithombhe asibukeki neze njengomdwebo kaLord Rosse. Yize kunjalo, kuyabonakala ukufana kwaso naleso esezipopolo iHubble esikwisihlangabeza salencwajana.



Indlela eyakhushululwa ngayo

Lento yakhushululwa nguzihelebhe kaGqayinyanga yamaNgisi, uJohn Bevis ngo-1731. Yaphinde futhi yakhushululwa nguCharles Messier wamaFulenshi, lapho ayebheka khona ubhaqanyezi lukaHalley olwalulindeleke ukuthi luvele futhi ngo 1758. Ngoba lento yayinyakazi, kwakungeke kube ubhaqanyezi.

uMessier wayihla njengeyokuqala kwisiqogelelo sakhe semiqongo kanye nezishomo ukuze angayiphambhanisis nobhaqanyezi.

Ngabo-1800, uWilliam Herschel wayibona kaningi lento ngezipopolo zomkhathi ezinkulu, waphetha ngokuthi iwumbutho wezinkanyezi. Ekudluleni kwekhuluminyaka, inhlolokukhanya yayo yakhombisa ukuthi kwakungesiwo umbuthelo wezinkanyezi, kepha kwakuwumqongo woqobo, wenziwe ngohowo olwaluhonyozekileyo. 3

Ngo-1054, uGqayinyanga waseShayina, uYang Weide wabona inkanyezi entsha sha emkhathini. Lenkanyezi 'eyisivakashi', nokuyigama ayiqamba lona, yayibonakala ngisho nasemini cishe izinsuku eziwu-23, yaqhubeka yabonakala ebusuku iminyaka emibili.



Les' isigameko siqoshwe kwizinganekwane ezindala zaseShayina ezifana nalena ebizwa ngeLidai mingchen zouyi (isinx). isiqephu esixikiwe sikhuluma ngayo inkanyezi le.

Les' isiwawa sabonwa nabase-Japani, eYurophu kanye nase-Alabhiya.

ezasi: indlela invange ekhombhisa ukudikiza kwezinto emukhathini.

Ukubhuduka kwemigqa yemvange kuhambhisana ngqo nesivinini sento ngokombuki.



iza ngakuwena



imile



iyasuduka

Inkalankala nesivakashi

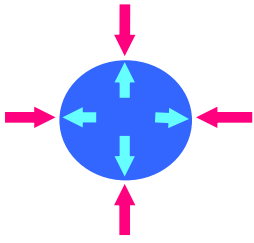
Ngeminyaka yama-1920's, oGqayinyanga baqapha ukuthi uma lwomqongo inkalankala lwaluqondene ngqo nalolo lwenkanyezi eyayisivakashi eyayibonwa oGqayinyanga bamaShayina ngo-1954.

Baphinde baqapha ukuthi ubukhulungoni bayo babuqhubeka nokukhula ekuhambeni kwesikhathi, kuthi imvange yamalangabi yona yayikhombha ukuthi yayihamba ngesivinini esilinganiselwe kumakhilomitha ayi-1500 ngamzuzwana*.

Lokhu kwaholela ekutheni bathi umqongo lo wadaleka waphinde waqala ukulwiza eminyakeni eyi-1000 eyedlule.

Ngo-1928, u-Edwin Hubble waphakamisa ukuthi umqongo inkalankala wawuyizinsalela zenkanyezi eyabonakala iqhuma ngo-1954. Asamukelwanga lesi isiphakamiso ngoba ngeleso isikhathi, ezomdiki zokuqhuma kwezinkanyezi zazingakaqondiswa kahle hle.

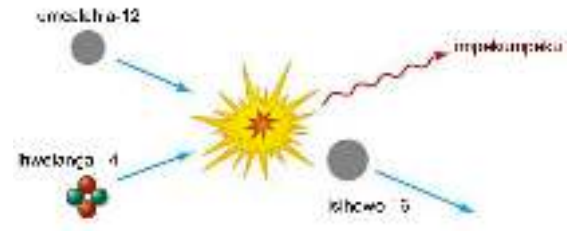
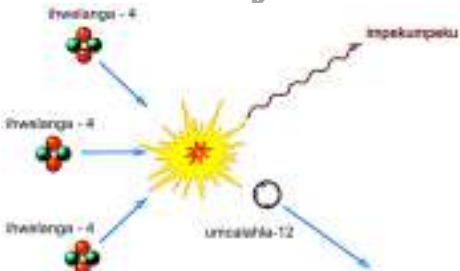
* Bheka ikhasi lesi-4



Impilo yenkanyezi iwumdonswano phakathi kweziphoqi ezimbili:

- uMnyondo oyimfinyozayo
- kanye nesicindezi esidala ukulwiza.

Endeni yenkanyezi, izinhlayiyana zenuzi ziyahlangana zikhiqize ezinesisindo esikhulu. Lokhu kukhiqiza impekumpeku kanye nesificezeli sokulwiza. Lapho khona isivamela, indeni yenkanyezi iyamfinyozeka okudala ukuthi amazanga okushisa ayo akhuphuke ebese kuqhubeka ukuthathwa kwamanuzi.



Okokuqala ihwanzi lithothana nelinye ihwanzi likhiqize ihwelanga, kuthi lona lithothane nelinye ukuze kukhiqizeke umcalahle, kuthi umcalahle uthothane nehwelanga ukuze kukhiqizeke isihowe nakanjalo. Ezinkanyezini ezinkulu, lokhu kungenzeka kuze kufinyelele ekukhiqizekeni kwensimbhi. Uma lokhu kuqhubeka kuze kube indeni yonke isiyinsimbhi, ukuthothana akube kusenzeka nokudala ukumfinyozeka kwendeni.

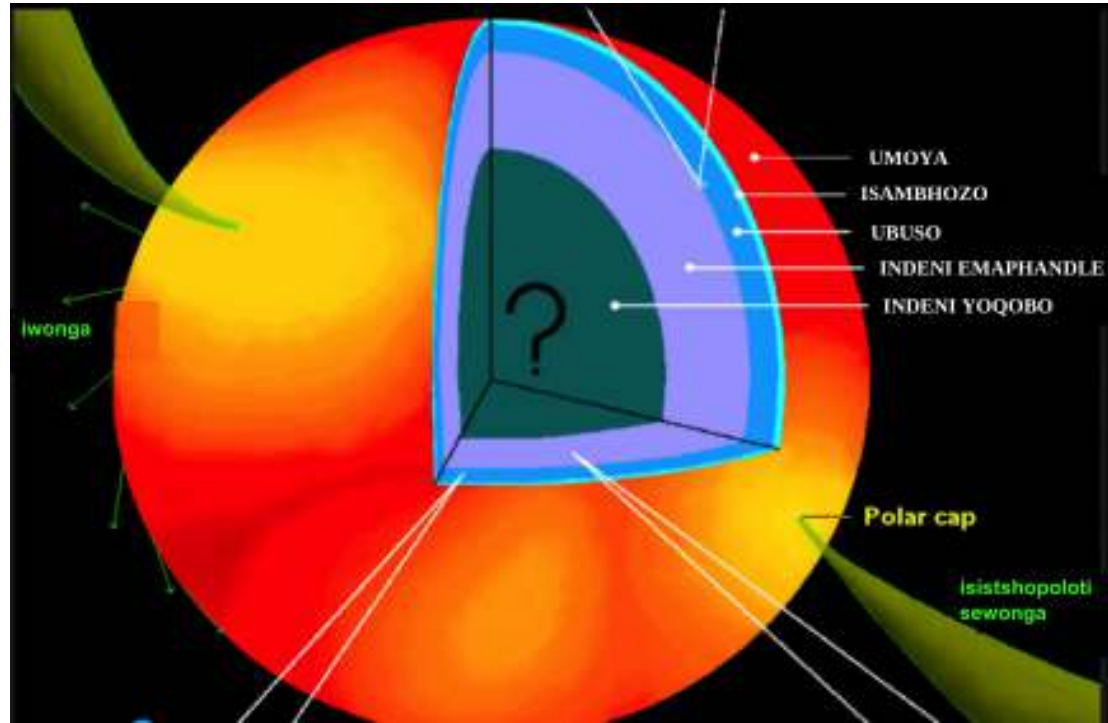
Isidanguzela

Ngo-1934, uBaade kanye noZwicky baphakamisa ukuthi loluhlobo lokuqhuma kungenzeka lapho inkanyezi ejwayelekile isiguquka iphenduka iba ileyo enobubanzi obuncane kanye nesiminyo esikhulu.

Into edala lenguquko yayingakaqondisiswa.

Ngo-1957, uBurbidge, uFowler & noHoyle bachaza kumhela onsika ukuthi kwenzeka kanjani ukuthi ingaphakathi elishisa kakhulu lezinkanyezi ezinkulu, izinhlwa zilokhu ziguquka ziba ilezo ezinkulu kuze kube indeni igcine isiphenduke insimbhi. Lokhu kulandelwa ukumfinyozeka okushesha ngalendla yokuthi kudaleka ubuyiselotho olujikijela izihalalazi zenkanyezi emkhathini.

Umkayo wenkanyezi entunge ngokuka Dany Page (Univ. of Mexico)



Uma ungena ngaphakathi sithola 'umoya' oshisayo onamazinga okushisa afinyelela kwizigi; ebese kuba isambhozo esithe ukuphola; kube ubuso bensimbhi obumncwebe; kulandele indeni emaphandle eyakhiwe ngezintunge, izintelezi kanye nezinxeleli ezimkhumanqa; ebese kuba indeni yoqobo eyakhiwe uhoyana olufanayo kodwa lona oluluketshezi, mhlaumbhe kanye nezimkemfe okuyizinhlayiyana eziyisisekelo ezihlangana ukwakha izinelesi kanye nezintunge.

Izinkanyezi ezintunge

Lapho indeni inkanyezi isiphendulwe insimbhi, uhlanganisotho alube lusaqhubeka nokuyilapho kulandela khona ukunyonta komnyondo esikhathini esiyimizuzwana. Ukudona komnyondo kunamandla ngalendlela yokuthi amachwe apitshizeka ndawonye. Izinxehesi zihlangana nezinelesi okuholela ekudalekeni kwembhulunga eyakhiwe ngezintunge futhi enesiminyo esinamandla.

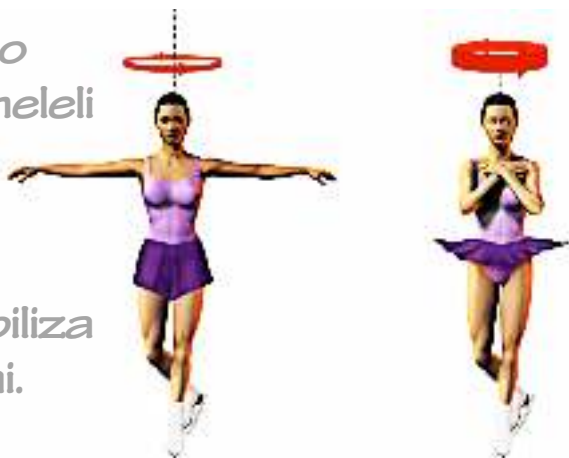
Inkanyezi entunge kumqongo inkalankala inkulu kunelanga kodwa ububanzi bayo kungamakhilomitha angama-20 nje kuphela. utho olulingana negeqela likashukela lungasinda ukulingana nesisindo sabo bonke abantu behlangene emhlabeni.

Kwiziminyo zezinkanyezi zentunge, izinto zenzeka ngendlela ehluke kakhulu kunanoma ikuphi kumkhathilibe.

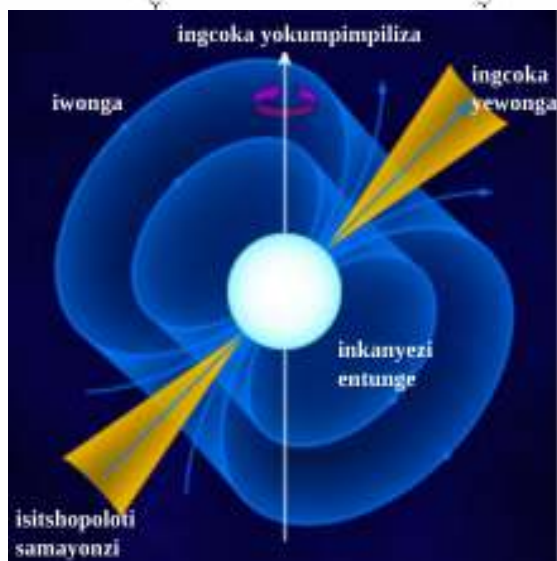
Ngokwezomchazandalo, siyakwazi ukugeqa ngengaphakathi lenkanyezi entunge.

Lapho kwenzeka ukubhoqoka komnyondo okudala inkanyezi, isivinini sokumpimpiliza sikhula ngendlela emangalisayo ngoba inkanyezi isuke isihongqobele.

Lokhu kuyefana nalokho okwenzeka lapho umsheleli empimpiliza nezingalo zakhe zivulekile ebese eyazigoqa ezisa ngasesifubeni: umpimpiliza kakhulu kunasekuqaleni.



Izinkanyezi zinewonga elinamandl futhi zikhafula amayonzi ngezitshopoloti ezincane kumachopho azo. Law' amayonzi abonakala kuphela lapho lezi izitshopoloti zikhombha emhlabeni.



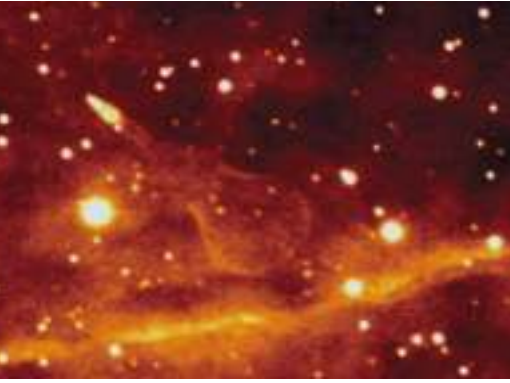
Lapho inkanyezi impimpiliza, isitshopoloti sishayela ubuso bomhlaba, amagamu amayonzi, agabeke ngokulinganayo esikhathini ayahlonzeka emhlabeni.

Unyazima inkalankala

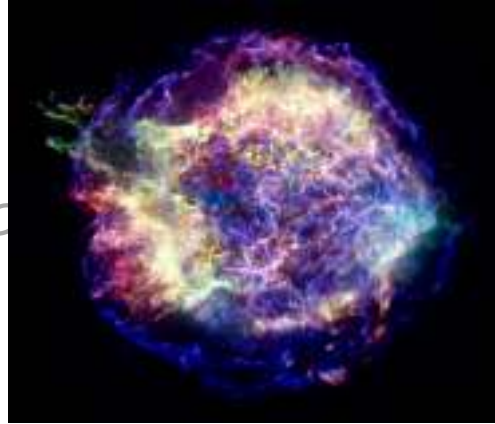
Ngeminyaka ye-1960, oGqayinyanga babona into eyeyngajwayelekile, isikhafulo esasinyazimayo emkhathini. Bakhombhisa ukuthi lezi izikhafulo zazisuka kwinto esemkhathini. Lolu uhlobo lwezikhafuli lwaqanjwa ngezinyazima. unyazima inkalankala lwalungunyazima lokuqala ngqa ukuthi lufukululwe.

HKowa emva kwesikhathi kwabe sekuqondisiswa ukuthi lezi izikhafulo kaziphumi neze kwinto enyazimayo, kodwa zaziqhamuka kwinkanyezi entunge eyayimpimpiliza ngendlela eyisimanga, ekhafula amayonzi kwizitshopoloti ezimbhili ezincane. Lezi izitshopoloti zazishanela emkhathini lapho inkanyezi impimpiliza, kuhle kwesihlomelo semikhumbhi. 11

Umqongo isiginci ekukhanyeni okubonwa yiso. Wakhiwe inkanyezi entunge ehambha ngesivinini esiphezulu.



Inxamaga ka-Cas A. kukhanya okwakhafulwa ukuqhuma kwenkanyezi kwafinyelela emhlabeni eminyakeni engama-300 eyedlule, kodwa abukho ubufakazi obuqoshiwe ngesi isehlakalo.



Isithombhe sezinsalela zesidanguzela iVela esthwetshulwa uGqayinyanga owayewuzihelambhe uMarco Lorenzi



Inxamaga yomqongo ombhoze unyazima ivela. izinkumbhela zakhiwa izinhlayiyana ezimpekumpeku ezikhiqizwa inkanyezi engtunge.

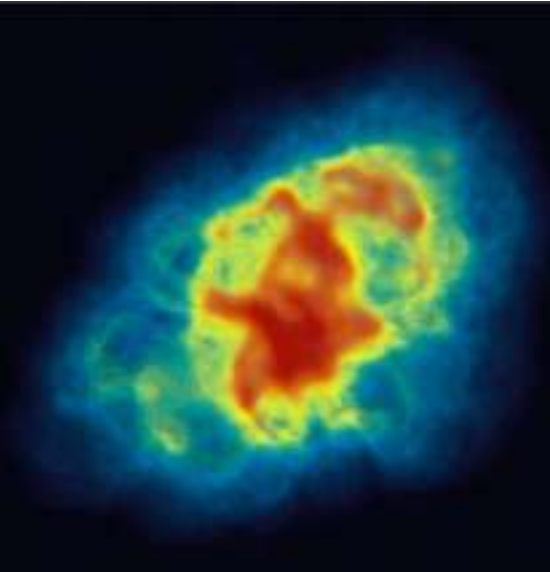


Ezinye 'izinkalankala' kmkhathilibe

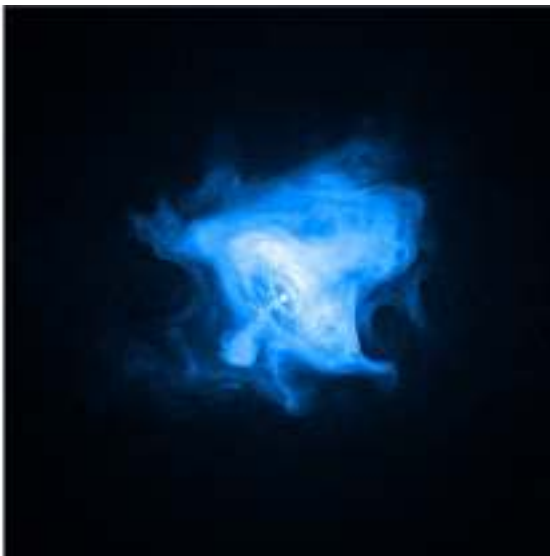
Ngenxa yenani lezinkan yezi esezifile kumzilafasimbhe, kumele kube khona izigidigidi zezinkanyezi ezintunge.

Kodwa-ke, iningi lazo seligugile okusho ukuthi amazinga azo okushisa asethambheme ngalendlela yokuthi azisahlonzeki. Ngisho nalezo ezishisayo zihlonzeka kuphela uma izitshopoloto zazo zamayonzi zibheke emhlabeni noma zikuhlelo lwamabhangqelo. Kulokhu kokugcina, amayonzi ashamagu avame ukukhafulwa uthuli olushisayo olusuke luwela ebusweni benkanyezi entunge.

Okwamanje ziyizi-3000 izinkanyezi ezintunge ezaziwayo kumzilafasimbhe, iningi lazo elihlonzwe okwezinyazima. Ikhasi elimalungana naleli likhombhisa izithombhe zezinye zazo.

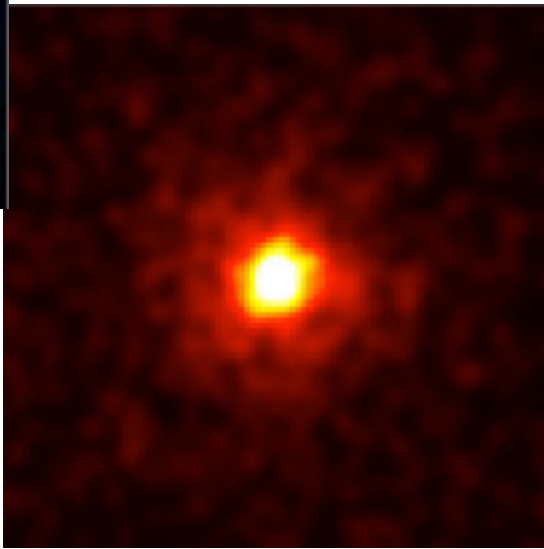


Imibuzo



Ngabe zonke lezi
izithombhe
zikhombhisa
umqongo
inkalankala na?

Izimpendulo
zingemuva






Isithombe
sensebomvu
esithwetshulwe
izipopolo iSpitzer




isiphafulo
esithwetshulwe iVLA

Zonke lezi
izithombhe
zikhombhisa
umqongo
inkalankala



inxamagu
ethwetshulwe
iChandra



isithombe
sehlwithanzuba
esithwetshulwe
iFermi

Umkhathilibe Ephaketheni Lami We-10

Lencwajana ibhalwe ngonyaka wezi-2018 ibhalwa nguGrażyna Stasińska WaseParis Observatory (France) yabe isibuyekezwa nguFabrice Mottez, uMikaela Oertel kanye noSilvano Bonazzola (bonke base Paris Observatory).

Isihlangabeza: umqongo inkalankala ithwetshulwe isihlongamkhathi iHubble.

Umchachambhiso: NASA, ESA, J. Hester, and A. Loll (ASU).

Ezinye zezithombhe ezikulencwajana zithwetshulwe izihlongamkhathi iHST, iVLA, iSpitzer, i-ALMA, i-Chandra kanye neFermi.



Ukuze ufunde kabanzi mayelana nalesi isihloko esethulwe kulencwajana, vakashela u

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