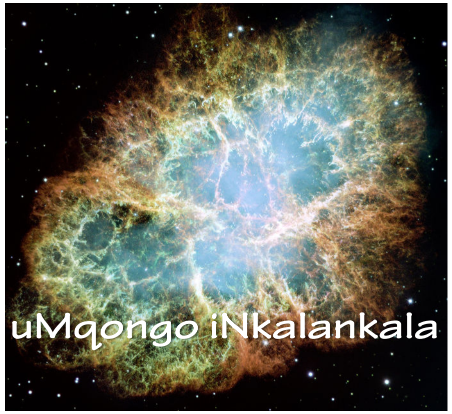
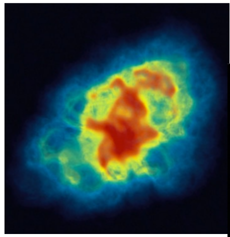
Umkhathilibe Ephaketheni Lami



uMqongo iNkalankala

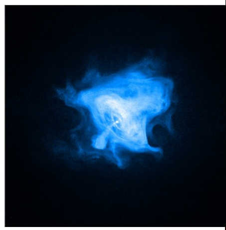
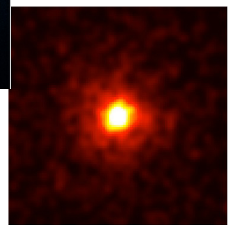
Grażyna Stasińska
Paris Observatory

TUIMP No. 10 THE UNIVERSE IN MY POCKET



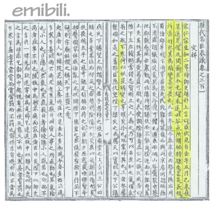
Imibuzo

Ngabe zonke lezi izithombe zikhombhisa umqongo inkalankala na?

Izimpendulo zingemuva

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 imvange ekhombhisa ukudikiza kwezinto emukhathini.

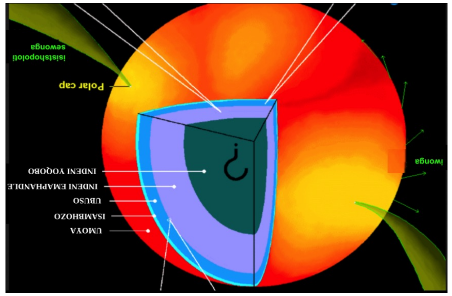
Ukubhuduka kwemiqqa yemvange kuhambhisana ngqo nesivinini sento ngokombuki.

Inkalankala nesivakashi

Ngeminyaka yama-1920's, oGqayinyanga baqapha ukuthi uma lwomqongo inkalankala lwalugondene ngqo nalolo lwenkanyezi eyayisivakashi eyayibonwa oGqayinyanga bamaShayina ngo-1054. Baphinde baqapha ukuthi ubukhulungoni bayo babuqhubeka nokukhula ekuhambeni kwesikhathi, kuthi imvange yamalangabi yona yayikhombha ukuthi yayihamba ngesivinini esilinganiselwe ku-makhilomitha 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-1054. Asamukelwanga lesi isiphakamiso ngoba ngaleso isikhathi, ezomdliki zokuqhuma kwezinkanyezi zazingakaqondisiswa kahle hle.

* Bheka ikhasi lesi-4

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



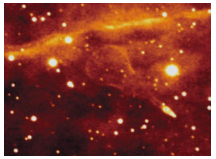
Uma ungena ngaphakathi sithola 'umoya' oshisayo onamazinga okushisa afinyelela kwizigidi ebese kuba isambhozo esithe ukuphola; kube ubuso bensimbi obumncwebe; kulandele indeni emaphandle eyakhiwe ngezintunge, izintelesi kanye nezinxelesi ezimkhumanga; ebese kuba indeni yoqobo eyakhiwe uhoyana olufanayo kodwa lona olulukelshezi, mhlaumbe kanye nezimkemfe okuyizinhlayiyana eziyisisekelo ezihlangana ukwakha izinelesi kanye nezintunge.

Izinkanyezi ezintunge

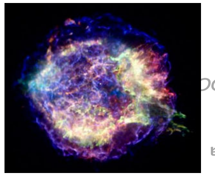
Lapho indeni inkanyezi isiphenduliwe insimbi, uhlanganisotho alube lusaqhubeka nokuyilapho kulandela khona ukunyonta komnyondo esikhathini esiyimizuzwana. Ukudona komnyondo kunamandla ngalendlela yokuthi amachwe apitshizeka ndawonye. Izinxelesi zihlangana nezinelesi okuholela ekudalekeni kwembhulunga 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 ehlukile kakhulu kunanoma ikuphi kumkhathilibe. Ngokwezomchazandalo, siyakwazi ukugeqa ngengaphakathi lenkanyezi entunge.

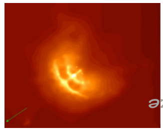


Umqongo isigiinci ekukhanyeni okubonwa yiso. Wakhiwe inkanyezi entunge ehambha ngesivinini esiphezulu.



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

Isithombe sezinsalela zesidanguzela iVela esthwetshulwa uGqayinyanga owayewuzihelembhe 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.

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

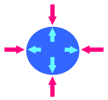
Lesi isithombhe asibukeki neze njengomdwebo kaLord Rosse. Yize kunjalo, kuyabonakala ukufana kwaso naleso esezipopolo iHubble esikwisihlangabeza salencwajana.

Indlela eyakhushululwa ngayo

Lento yakhushululwa nguzihelembhe 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 yayinganyakazi, kwakungeke kube ubhaqanyezi.

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

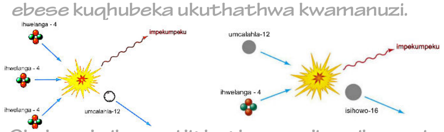
Ngabo-1800, uWilliam Herschel wayibona kaningi lento ngezipopolo zomkhathi ezinkulu, waphetha ngokuthi iwumbutho wezinkanyezi. Ekudluleni kwekhuluminyaka, inhlolokukhanya yayo yakhombhisa ukuthi kwakungesiwo umbuthelo wezinkanyezi, kepha kwakuwumqongo woqobo, wenziwe ngohowo olwaluhonyozekileyo.



Impilo yenkanyezi iwumdonsiswano 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 amazinga 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

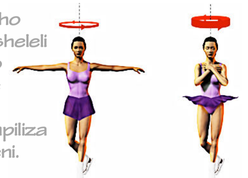
Ngo-1934, uBaade kanye noZwicky baphakamisa ukuthi loluhlobo lokuqhuma kungenzeka lapho inkanyezi ejwayelekile isiguquka iphenduka iba ileyo enobubanzi obuncane kanye nesiminyo esikhulu.

Into edala lenguquko yayingakaqondisiswa.

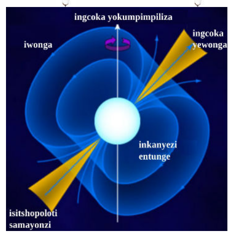
Ngo-1957, uBurbidge, uFowler & noHoyle bachaza kumhela onsika ukuthi kwenzeka kanjani ukuthi ingaphakathi elishisa kakhulu lezinkanyezi ezinkulu, izinhlwa zilokhu ziguquka ziba ilezo ezinkulu kuze kube indeni igcine isiphenduke insimbhi. Lokhu kulandelwa ukumfinyozeka okushesha ngalendla yokuthi kudaleka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

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.

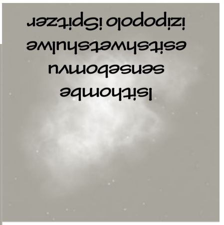


Lapho inkanyezi impimpiliza, isitshopoloti sishayela ubuso bomhlaba, amagamu amayonzi, agabeke ngokulinganayo esikhathini ayahlonzeka emhlabeni.

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.

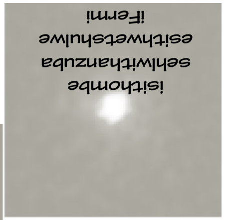
HKowa emva kwesikhathi kwabe sekuqondisiswa ukuthi lezi izikhafulo kaziphumi neze kwinto enyazimayo, kodwa zaziqhamuka kwinkanyezi entunge eyayimpimpiliza ngendlela eyisimanga, ekhafula amayonzi kwizitshopoloti ezimbhili ezincane. Lezi izitshopoloti zazishanela emkhathini lapho inkanyezi impimpiliza,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



Isithombe sensebomvu esitshwetshulwe izipopolo iSpitzer

isiphafulo esithwetshulwe iVLA

Zonke lezi izithombhe zikhombhisa umqongo inkalankala



isithombe sehlwithanzuba esithwetshulwe iFermi

inxamagu ethwetshulwe iChandra

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.

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