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A Westerbork blind HI imaging survey of the Perseus-Pisces filament in the Zone of Avoidance

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Kakaretso ka Sesotho

Dintho tse dutseng sebakeng se ka morao ho Molalatladi (Milky Way) ha di bonahale hantle ka baka la lerotho le bakwang ke maru a lerole le ho teteana ha dinaledi tse ka hare ho ona Molalatladi. Ho se bonahale hona hwa "*nebulae*" tse sebakeng sena ho sibolotswe ke Proctor (1878) lesedinyaneng le bitswang *General Catalogue of Nebulae* (Herschel 1864). Ka nako tseo ho ne ho sa lemohwe hore *nebulae* tsena hantle ke melalatladi (*galaxies*) e meng e dibakeng tse hole haholo le Molalatladi wa rona. Semelo le bohole ba tsona se tlisitswe ke ho lemoha *cepheids* ka hara *nebulae* tsena, empa ka nako eo ho ne ho sena tlhaloso kapa kutlwisiso ya ho ka hlalosa lebaka le etsang hore melalatladi ena e se bonahale. Ho ile hwa tholwa ka morao hore maru a lerole a baka hore melalatladi e se hlake hantle kapa e se bonahale. Ka labaka lena sebaka seo se ile sa rehwa "sebaka sa lerotho" (*Zone of Avoidance-ZoA*; bona lesedinyana la Kraan-Korteweg & Lahav 2000a bakeng sa tlhaloso e felleletseng).

Boithuto ba melalatladi e ka hare ho ZoA

Ha re tadima sebaka sa lerotho (ZoA) re fumana diphephetso tse re fang thahasello ya ho ka fumana se hlileng se etsahalang ho sona. Ha re sheba melalatladi e ka hare ho ZoA ha re a labella letho le ka fapanang le melalatladi e dibakeng tse ding tse senang lerotho lena. Boteng ba sebaka sena ha bo fetole kutlwisiso ya rona ya hore melalatladi e bopilwe jwang. Le ha ho le jwalo, ho ya ka dithuto tse hlalotswang ditokomaneng tsa Rowan-Robinson et al. (2000) le Loeb & Narayan (2008), sebaka sena se lerotho se etsa hore re se utlwisise ka ho phetahala hore melalatladi e ka hare ho Bokahohle (Universe) bo haufi le rona e tsamaya ka tsela e

jwang.

Se fumanehang ka (HI)

Mokgwa o motle wa tshebetso wa ho ba tseba hore semelo sa melatatladi tse ka hara sebaka sa lerotho (ZoA) ke ho tadima kgase e bitswang (*neutral hydrogen*-HI) e tswang ka hare ho tsona. Boputswa ba Molatatladi bo a hlaka ha re sheba sebaka sena re sebidisa HI, ka lebaka lena dithuto tse ngata tse shebaneng le ho utliwisisa melatatladi e ka hare ho ZoA di sebedisa mokgwa ona wa ho sheba HI. Ka ho etsa diphuhutso, le ho ithuta ka HI, re ka kgona ho thola lesedi la hore melatatladi ena e bopilwe jwang le hore e fetoha ka mokgwa o jwang. Le ha hole jwalo, dingata tseo re sa ditsebang ka boemo ba melatatladi, ka lebaka lena diphuphutso tse tebileng le tse hlokolosi di ntse di hlokahala.

Mosebetsi ona

Mosebetsi o tekwang mona o qholoditswe ke diketsahalo tsa morao-rao tse neng di shebane le diponahalo tsa HI tsa melatatladi e kganyang e neng di hlalohjwe ka hare ho ZoA ka *telescope* e bitswang *Nancay Radio Telescope*-NRT. Sephetso se tswileng boithuting ba NRT se bontshitse hore ho ka nna ha ba le sebopeho se nang le malatladi e mengata, se teteaneng, se tshelang Molatatladi. Tsena di hlalositswe tokomaneng ya Ramatsoku et al. (2014). Sebaka le bohole ba sebaka sena se teteaneng bo hokahantswe le sebopeho se sehlo-hadi sa kgwele ya dihlopha tsa melatatladi (*supercluster*) se bitswang *Perseus-Pisces Supercluster*-PPS (Giovanelli et al. 1986, Haynes et al. 1988). Bo teng ba sebopeho sena se teteaneng bo ne bo ile ba belaelwa bo le teng boithutong bo ileng ba etswa kgajana (Focardi, Marano & Vettolani 1984, Chamaraux et al. 1990), empa leha ha ho le jwalo sena se so netefatswe. Ka hare ho sebopeho sena ho fumanehile kgobokano ya melatatladi eo e neng e sa tsejwe ka botlalo o bitswang *3C 129 cluster*. Ha ho letho le neng le tsejwa ka melatatladi e ka hare ho kgobokano ena.

Ho bohlokwa ho fuputswa melatatladi e kgobokaneng ka tsela ena hobane e re fa tsebo e pharaletseng ya hore Bokahohle bo bupuwe jwang.

Mokgwa wa tshebetso

Boithuto ba HI bo ile ba etswa bo tobile lebota le akaretsang kgobokano e na ya *3C 129 cluster*, le dibaka tse haufi le yona tse amanang le *Perseus-*

Pisces Supercluster. Re ile ra sebedisa *telescope* e bitswang *Westerbork Synthesis Radio Telescope-WSRT* ho hlaloha leboha lena. Sebaka sena se ile sa sejwa ka ditshupo tse mashome a mararo a metso e mehlano (35), mme e nngwe le e nngwe ya ditshupo tsena ya sejwa bolele ba hora tse leshome le metso e mmedi (12) ka WSRT.

Kakaretso ya diphetho sa Mantlha

Sephetho sa mosebetsi o fihletsweng boithutong bona se ka akaretswa ka dintlha tse tharo tse hlalositsweng ka tlase:

Kopantshong ya dibopeho tse kgolo hara ZoA: Kakaretso ya ditereke tse nne tsa tshubehlellano ya melalatladi di ile tsa fumanwa. Ho tsena, tse pedi tse kgolohadi di fumanaha boleleleng ba PPS le ka morao ho PPS. Dihlopha tsena tsa melalatladi di ile tsa sebediswa ho bontsha hore ruri kgobokano e kgolohadi ya PPS e kopana ka hara ZoA, mme ya netefatsa dipono tsa pele tsa Focardi, Marano & Vettolani (1984) le Chamaraux et al. (1990). E bile di bontsha hore kgwele e na e tletseng kgobokano tsa melalatladi e leng PPS ke yona e kgolohadi ka hara Bokahohle bo haufi le rona.

Sebopeho sa Kgobokano ya melalatladi ya 3C 129 cluster: Ka hobane semelo sa 3C 129 *cluster* se ne se sa tsebahale hantle, le hore kgobokano e na e na le melalatladi e kae ka palo. Re ile ra nka diphuphutso tsa ho hlaloha hore e boholo bo bokae. Re sebedisitse melalatladi e ileng ya fumanwa ka HI le e fumanweng ka mokgwa o mong wa *near-infrared*. Sephetho sa diphuphutso tsena se ile sa fumana hore kgobokano e na ya 3C 129 *cluster* e na le melalatladi e ka bang 261, ka hoo e kgolohadi ha re e bapisa le kgobokano tse ding tsa melalatladi tse bohole bo tshwanang le yona.

Ditlamorao tsa tikoloho ho HI: Bongata ba pokello ya HI ho tswa boithutong ba WSRT bo hlalositse phapano e kgolo ya dibaka, ho tloha ho ditokoloho tse kgolohadi tse nang le dihlopha tse ngata tsa melalatladi ho ya ho tikoloho tse nyane. Ho na ho ile hwa re fa monyetla wa ho fuputsa hore tikoloho e ama HI ka hare melalatladi ka tsela e jwang. Re fumane hore ka hare ho tikoloho tse teteang, HI ea tloswa ka labaka la ho thulana ha melalatladi, mme sena se fetola sebopeho sa melalatladi ena.