



LIGO
Scientific
Collaboration



Blackfoot Translation of GW190814 LIGO Virgo Science Summary
(see note at end of document)

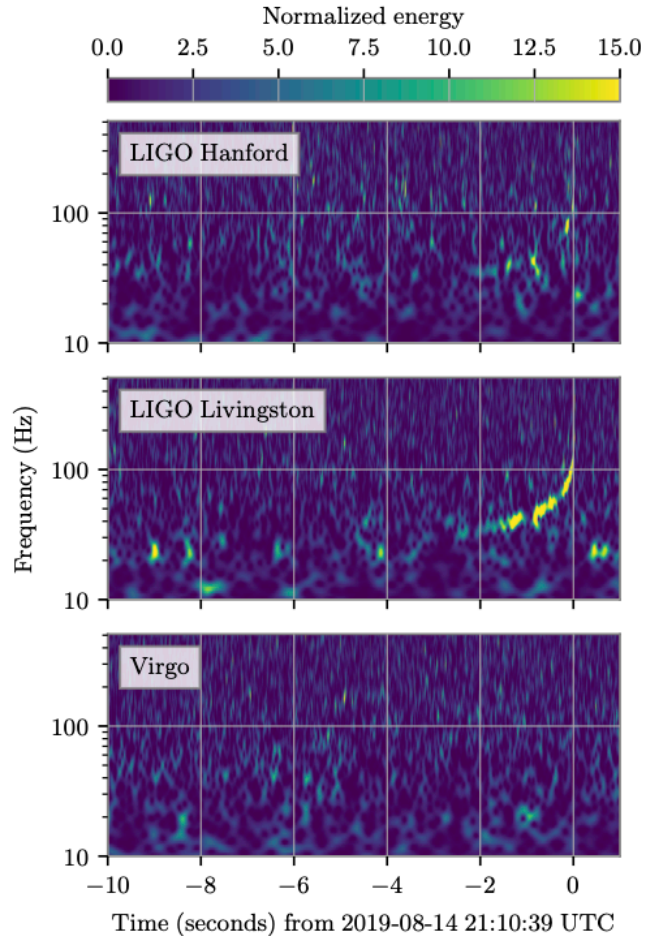
amu?k Abatu?gwisxiniip *essaganistsii* GW190814: axibutstsiiya gagaduusiists-*spiguyis sigooxga* gii anI ixumidabii o?ganstsiiya Iyiniibiists

ani_k *idepu**gyagyup nis*wig*ubuuui, 2019,
nadugisduuyiixis madumanisdAsii
nyuxge-itu?gutsiisaduubyuyix n^{ess}xgatsimya mistsk
Abuduuxbiisii o?bigimskaa *Iy*inap*sgagii*
(GW170814), *nadugaya* Advanced LIGO
itu?gutsiisaduubyuyix miim *amsgabuu*?ts, anim
Hanford, Washington gii Livingston, Louisiana, gii
Advanced Virgo *itu?gutsiisaduubyuyix* miim Cascina,
Italy, n^{ess}xgatsimya *matstsigi* Abuduuxbiisii
o?bigimskaa *Iy*inap*sgagii* i *dutstsi* ixumidabiinatsi.
mixsk LIGO-Virgo *itu?gutsiisaduubyuyix*
*bitsioxgadu*umya *nuuxgl* *ess*xgatsimya *oxgasiya_03*,
*itsxgatsimya iixku**dagu o?ganabii, *a?~ku**danistsiiw
*nAsagu*uya gii *iibuutu*?biiya *nadugaya* o?ganstsiiya
Iyiniibiists- amui *sigooxga*, gii anii xistapsxinimya.

nadugaya i *tsstun*natsugabiya mu?k
uutsu?guunimanuwa nitsini_gaduup GW190814
*ix*tibisadabiya. *niduxge*, amui *iixsugu* o?ganstsiiya
Iyiniibiists i~ku*s*ib*yago *spiguyi* gii
stunadu~ma?gadum gii anim
*matstsigaku**bugabessima, aganyup
madani~kuguAstsii *itsii* daan *ess*xgatsdagiya
mistsk Abuduuxbiisii o?bigimskAAsts anu?k.
naduge, *utspiguyis* n^{ess}xgwiip amui i~ku*bugi
o?ganstsii *Iyiniibi* aganistabi sa?gwinatsi sigooxga gyl
*iixstun*atsugu *bugutsitsbiixiya* *gagadusii*
ago?gwisxinimya mustsk *itsii* daanix *nadugaya*
o?ganstsiiya *Iyiniibiists* - *madess*xinibinaan.
ebuutstsiiya, i *tudess*sagidumanistsup *otsis*dabitsiip
*spiguyi*ists amustsk o?ganstsiiya *Iyiniibiists* gii
*tsai*_doduya *iibutstsi*ya *itsii* daanix.

Abuduuxbiisii o?bigimskaa *Iy*inap*sgagi*

amu?k abessatsduup Abuduuxbiisii o?bigimskaa
*Iy*inap*sgagi* niistsii agooxtsiimaan *awan*isduutsiip
niixi *itu?gutsiisaduubyuyix* i *do*?gwigiya
aganistsiists i *dodagiya* *ess*dagiists, *agi*itsibutsdumya
agooxtsiimaan *iigay*issxiimaaniists miistsk
*Iy*inap*sgagii* nam Einstein's *bisaats*insiimaan.
*imadess*xgatsimsiniists *nidaku**tsxinibinaan amui
niduxge gibuma?xdudaxin issduyiists amui
GW190814 ba?*tsabi*w *e~gamu*?suganistsii
*itu?gutsiisadu*umyatsix ixistsabi. GW190814
*nyuux*ganistsii *iixku**dagu o?ganabi
*nidess*xgatsibinaan anu?k xistsigui (Apstsiixisamuu
GW170817 gii GW150914). anistsiiw



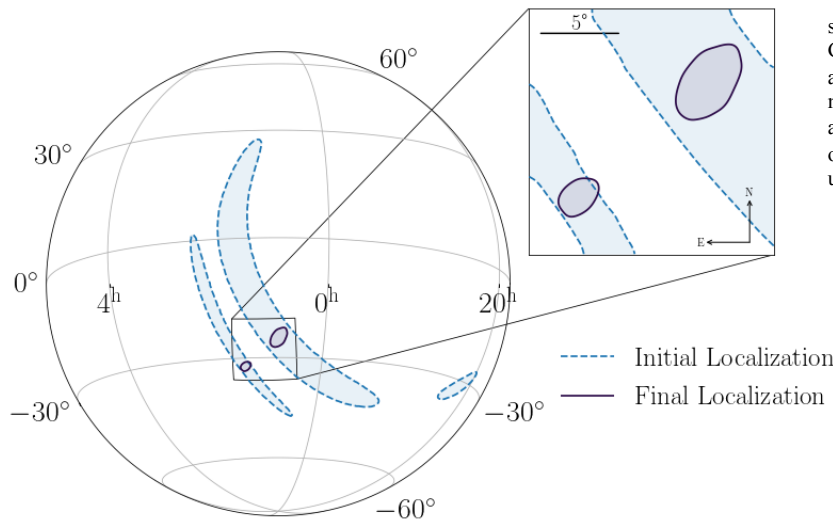
sinaxin *niduxge*: idudu-*axs*abaduum Astamatsugiix amustsk
agooxtsiimaan itstsiya GW190814, *n^{ess}x*gatsimya miixi LIGO
Hanford (*isbitstsiw*). Ligo Livingston (*datsig*yu), gii Virgo
(*xiyuu*?ts). *utsidudu**buwa *itsin*Abya gibui issxiinidaxin bitsiistuu
uudo?gabis. anii esstuumskuutsp agidabidumAdagyup
idudu-*axs*abaduum *idAsa*~pi_dagyup Astamatsugi amustsk
*mutsin*atsiists. amu?k *biixini*_gi *Iy*inap*sgagii* *iixu*xiniip anii
*datsig*yu isstaxinya (LIGO Livingston agooxtsiimaan), *anim*
amu?k *Iy*inap*sgagii* *iixku**dagu.

Visit our websites:
<http://www.ligo.org>
<http://www.virgo-gw.eu>



ixstunatsiixku*dagu i_tsinimya uuwapsbiix anii sinaxin Astamatsugi axsabadium itsinAp **Figure 1**, Astamats~tu*gi tsa axsabadium mustsk Iyiinapsgagii ayu?gitsiya otsistsganistsii.

gyamu?k 03, niixi LIGO-Virgo essdudabodagiiya Astamibuutsimya gyannimI ayiinapsguwa madabiix a?gigamabanistsiiw Abuduuxbiisii o?bigimskaa oo?gutsiisaduumyatsiix. amustsk o?ganessxinimya madabiix ayiinapsguwa itstsiya agudumanugiya itsiinixin ido?gwisxinimya tsiima i_duutstii mu?k uutsu?guunimanuwa, gyl anistabiww uutsu?guunimanuwa odudamitsiip. GW190814 ne~gamu?sessduuya niixi madabiix Adudu natsibu natsibusxinidaxin Axisdapsii oo?gutsiisaduumyatsix gyanistsii odudamitsiip mu?k “spiguyis iinaxigawestsii.” anistabanyusin niduxgaya amustsk o?ganstsiya Iyiniibiists aganyup utsspiguyis itsidugesstii nyuxge gii nisidui otsitsganistsuu anii utsspiguyis nam nadas, M_{\odot} . amu?k aginistabiww mu?k “spiguyis iinaxigawestsii” i_tu*daya?guminugii dapsxsaduumya amustsk essxgatsiipiists sigooxgaya utsspiguyisuwa xiiu?ts manisti_bii nisidui M_{\odot} . amu?k matsabanistsuu sigooxgaya spiguyis awanisdup “inuAbixiip” spiguyis iinaxigawestsii.

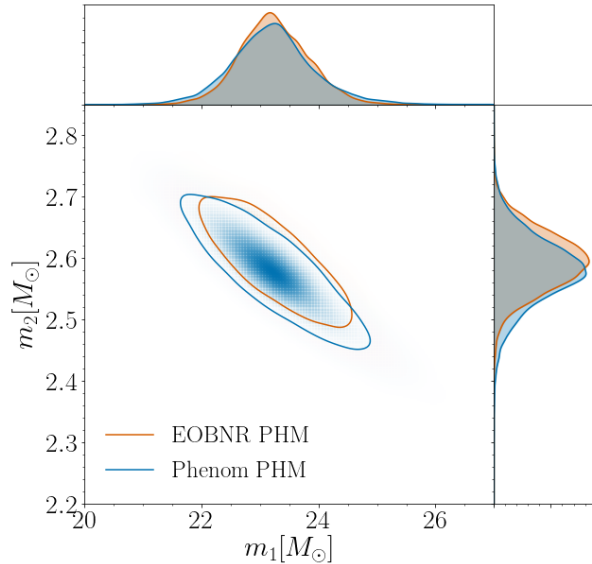


sinaxin naduge: amuu spu?ts itu?gunimya mu?k GW190814 Iyiinapsgagii a?~ku*duutstsiww. anistsi uutsgwinatsi o?batstsiipiists maduumu*guunimya idessxgatsimya niistsi agooxtsiimaan, gyannistsi sigumo?xinatsi o?batstsiipiists itstsiya gyannyI spu?ts uutuu?guunisuuwa .

mistapu?ts idessxgatsiip miistsk Iyiinapsgagii aku*danistsiiw nitsuuxstuup miistsk spiguyiists, gii nAsubuyapu*duumya nAsugabanisdumya niitsigubudui esssAsaguistsii itu?tsuwatsumya mu?k uutsu?guunimanuwa odudamitsiip “NSBH,” i_dotsidabidagiya amuu o?ganstsiya Iyiniibiists uspiguyis gagidutstii $3 M_{\odot}$, aganyup anisdabiww manistsuu bugutsitsbiixiya gagadusii. mu?k uutsu?guunimanuwa a?gitstsiww amuu spu?ts ina~ku*tstsi natsibui atsutsixistdusi udaganistsi_p (satsit sinaxin nuuxge). nidutsibinaan amustsk Iiinapsgook, gyaxsabak abessatsimya, udayaganistsi_p mu?k GW170817, axistudanistsiya babusuxbiisiiests Asabaduumya gii sta~oyixiists myanisdAsisixinibya isstsga, inoganistsiiw matu*gwiniimya matsstigi nuu?gitsiists Abuduuxbiisii o?bigimskAasts.axigamanistsii, udaganistsiip, i_tu*tssxinimya GW190814 igutsitsxibistsiiw mi_k GW170817 gii agessxiniip issxgwiipiists uutsu?guunimanuwa Astamatsaa (satsit xiiu?ts) madAdapstsiya iixgunadapsi babusuxbiisiiests abatseesiiduyi.

Astamatsaa mistsk uutuu?guunimanuwa

aniiw stunatsissugu o?ganstsiya Iyiniibiists anuum itsii daan utsspiguyis aganyup Adamaagidutstii natsibunuuuxe M_{\odot} , niiduyaanistsiiis amustsk sigooxgaya essxgatsimya niix LIGO gii Virgo anu?k (satsit sinaxin nuuxge). utsspiguyis anI ixa?ku*tsi o?ganstsiya Iyiniibiists idessstsiww datsigaa?ts naduge gii ano?guts gii nuuxge M_{\odot} , agitsduup itu*gidesstsi amuu stunatsissugu nessxinuwa bugutsitsbiixiya gagadusii, MSP J0740+6620, gii itsida?desstsi miix nidu?ganistsii spiguyiists muxsk sigooxgiya noo?gutsiisaduumya nAbu?sa~pi_kaduumAasts babusuxbiisiiests essxgamiieststsiists. inoganistsiiw, iiduutstsiw utsspiguyisin anii o?ganstsiya Iyiniibiists (a?gamanisdabiww sigooxga) i_dubitsiip mu?k iibuutu?biiya nadugaya bugutsitsbiixiya gagadusiix nAnimya mu?k GW170817.



sinaxin nuuxge: *amustsgogya odumu?duup spiguyiists nadugaya* o?ganstsiya Iyiniibiists i_tu**duutstsiw* GW190814. amuu *emmixgAstsi* **AXIS** Astamatsugi *manistspigi* anI *utsitsxsugu* Iyiniibii, gyamui nAxgesstsi **AXIS** Astamatsugi *manistspigi* amu?k *ixa?ku*tsi* Iyiniibii (*aganisdabiw bugutsitsbiixiya* gagadusii gyl sigooxga). anistsii subuyapsama gii *axixsinAp* itstsiw *Astamatsugi u?dayagiss* Astamatsugi *igama*giibuutsduupiists mustsk *spiguyiists niiduyaanistsi*ya amustsk agooxtsiimaan. *gyaniistsi nayumuxtsi matsstigi* issaxina *s~bii* gii *naawuu?ts a~ku**guda *niduyi agani~tu*gudaya* amustsk *a?gamiduu*tsi^{ya} *u?dayagiss* niitsstsiw *spiguyiists*. amusts *nadugaya* itstsiw *nadugAst*s nu?*gitsiya* manistsinim itu?bugabistutsiipuwa *ügayissxinim* anii *Iyina*psgagii mu?k bisaatsinsiimaan.

igagimaduupya nam Einstein gii Hubble

GW190814 mis~ku**gu*gi aguutsabiya *ido?ganop**iists amustsk *istsgaabiists*. gyamu?k GW190814 *igutsitsstsiw* adani~ku**guwAstsi*wa mi_k [GW190412](#), *iganistsibatsi*w itstsiya *essbi_bugAni_gi*, gyl *s~biisi igagawuya* nuu?gidanistsi^{ya} i_desstsiimoby mistsk Abuduuxbiisii abatseesiiduyii *itsstsiya* *gagidodabaniya Iyina*psgagii. amu?k sugabi *ogaxtsimaya* ani_k bisaatsinsiimaan *agayixxinimya* mistsk nuu?gidanistsii i_desstsiimoby omudabAsi^{ya} Abuduuxbiisii abatseesiiduyii.

*nidanisduutsi*binaan *madago* gagessxi axtsiinAxinimya mu?k bisaatsinsiimaan anii GW190814 gii *ni~tu**gunibinaan mu?k *Iyina*psgagii (sinaxin *nisui*) *Astamatsugi* ixsu~ku**-Astamatsa* ani_gI *iibutstsiya nadugaya* sigooxgaya. inogu?gitsii, *matu**gunimIya axsaganistaya anI sa~ku**tsi* Iyiniibii a?xawanisdabiw mutstsi^{gi} *nomaniya* awaniya anistabi^w sigooxga, *imadanistsi*w amu?k bugutsitsbiixiya gagadusii gyl *matsstigi agitsibisatsi*siip.

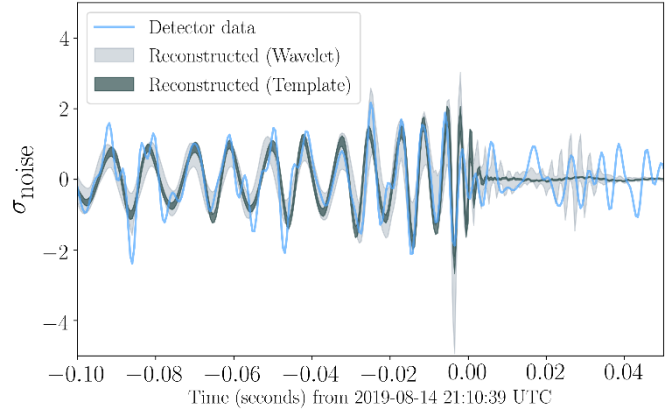
amu?k GW190814, *mani*w, amu?k Abuduuxbiisii-o?bigimskaa-itstsiw issxgwiip mu?k [Hubble Constant](#) H_0 , anu?k *axidobuma?gu* manistsigamu?bi_p nuum spuu?ts. GW190814, nu?k xistsigui, i_tu?ganAsugabi-anuum Abuduuxbiisii-o?bigimskaa uutsu?guunimanuwa nuum spuu?ts *madAnuwanaan* matstsi^{gi} miistsk *babusuxbiisii*sts *Asabadu*mya gyl *sta~oyixi*ists myanisdAsisixiniba issstga. gyamu?k *idotsistabidag*yup, *agidayagisxgwiip* H_0 , *nidawanisduutsi*binaan mo?xinatsi *asuku?bi* anii uutsu?guunimanuwa *idodudamapsii* spu?ts *utsiidamiit*. i~gamu?sawitstsi^s matstsi^{gi} Astamatsugii anI *idodudamapsi* spu?ts *utsiidamiit* *bisadabi*, *axtsinAsatsip* a?gamayagudamapsi^{ya} o?ganessxinuwAx spu?ts *utsiidamiit* miim GW190814's itu?ganAsugabi-anuum idubobiss i_duutstsiw. agitsigigagimaduup amu?k Hubble constant axtsinAbuutsduup o?ganAbuutsduup utumo?xinatsi *asu~ku?bi*, aginogessxgatsiip miixsk matstsi^{gi}ists *idodudamapsi*, gyamu?k Abuduuxbiisii-o?bigimskaa tsaanitsibuyu issxgwiip. gyamu?k *oxdagubi*ists, *idessxgwiip* H_0 , aganyup matsidapsxinyup, itstsiw 75km amustsk issxiinidaxin amustsk stunatsibuyu, aganyup iduutstsiw gii bitsiistui *essxgatsiip* Abuduuxbiisii o?bigimskaa uutsu?guunimanuwa gyamu?k matsitstsiip matstsi^{gi}.

gyamu?k madani~ku**guwAstsi* spiguyiists anii *iguma?gu* gyanI *iku**bugim *essbumugiya ayessxgwiip* mustsk uutsu?guunimanuwa *Astamatsaa igaxn*manyup. *utsitsganistsi*w amu?k madani~ku**guwAstsi*, *aguutsitsxgunabi*w anI *anagu* itsspi^{ga}asaya “i_bugAni_gi” miistsk *utsidomAda~kibowI* *axsabadu*um anistsk Abuduuxbiisii o?bigimskaa *Iyina*psgagii, aganyup nAdumanistsi^w ixu~guyutsgadu miixsk *Asatu*du*gi *agidAsA*psgabada. *ayessatsi*ip miistsi *matsiidumani~ku**gutstsi^w-*spiguyis* sigooxga *iibuutu?bi*ya [GW190412](#), *madumanabisin* i_datsstsi^w manist^{bi}stsi^w gii utsitsga?si^{ti}ip anii *itsii*_daan *nAna~ku**buniip anistsii matstsi^{gi} *axsabadu*up aniw *sbiga*asa i_bugAni_gi. gyamu?gI *niduumu*tsxinibinaan* Abuduuxbiisii o?bigimskAAsts *nitsin_gadup* GW190814 i_tu**duu*tsstsi aganyup nanisigubuudu *abawawa?go* issduyiists axiibiisabesspsabii *ixt*bisstsi^w.

o?ganstsiya Iyiniibiists *agani*istⁱⁱya bugutsitsbiixiya gagadusi^w gii sigooxga *aguduya ma?gidodaku*biisii*. madAxtku*tsi^wAxa Abuduuxbiisii o?bigimskaa *Iyina*psgagii *matsgunadapsii* utsspi^{ga}yuiists, i_tu**dli*gu *agidayaku** issxgwiip. GW190814 anistabi^w *iximuyi*w *Iyina*psgagii miix itu?gutsiidauubyuyix *notsimya* *negubudui* issxiinidaxin. *utsigaxku*dagu*u anI *Iyina*psgagii, *essgagani~ku** *na?k*gabissduutsibinaan Abuduuxbiisii-o?bigimskaa *essxgwiip* amui sigooxga *udoda~ku**biisin anu?k xistsigui: *madagagowa* amui *gitsig*liists miistsi utsitsgago oda~ku**bii* *essgagani~ku**tsiya mu?k bisaatsinsiimaan. *nimatu*tsxinibinaan* amu?k *itsii*_daan *madAxtsiku*bi*.

gadanisdabii *ixa?ku*tsi o?ganstsiya* Iyinibi *bugutsitsbiixiya gagadusii gyl sigooxga?*

amuu *ixa?ku*tsi o?ganstsiya* Iyiniba *utspiguyisin* anistsinam anii *ixbibuyi iixsugu bugutsitsbiixiya gyl* madu?gAganistsiip *ixa?ku*tsi sigooxga*. *Asuganistsiww, odumu?duup a?ganisdabiww bugutsitsbiixiya gagadusii agitsatsiip Asabadaya* mistsk *essbiguyii* anistsii *Abuduuxbiisii o?bigimskaa Iyiinapsgagii*: anii ayagibuuttsii *iitsii* daan itsiinAbyaa amu?k *bugutsitsbiixiya gagadusii*, anii *Abuduusbiisii o?bigimskaa Anugiyada* miixi *aku*bugabessima axbinimya amux essbiguyii amiists* *bugutsitsbiixiya gagadusii*, aganyup *niduya* anii *uuma?go?gii essbiguyi* anuum xa?gui *ax~wa?subutsisuup* anah *gugumiigiisi*. *udayesxgatsibuwa*, mustsk *itsii* dan *ixstunaduma?guu* gii *madani~ku*guwAstsii* anI *GW190814*, anii *essbiguyi Asabadaya igumo?bugiww* a?gitu*gwissxgwiip. anistsiww *nidessaku*gwissxniibinaan essbiguyi* madawanikginaan mu?k *GW190814 a?ku*danistsiww* *iibuutu?biiya* anI *sigooxga* gii *bubutsitsbiixiya* gagadusii, *gyl nadugaya sigooxgaya*.



sinaxin *nisu!*: sinaxiniists amusts *nida~pu*itu?gutsiisaduubyuyix* agooxtsiimaan (*uutsgwinatsi nayumuxtsii*) gyan utsidu?du?p (*emmixgAstsii AXIS*) mu?k o?ganabi, *gyannistsi iigayissxinimya* mu?k *Iyiinapsgagii aganiistatsiww*. anii madunayixstabinam *igitsinatsi i_tsisixibiip* Astamatsugiww manistsinim itu?bugabistutsii *iigayissxinimya* amu?k *Iyiinapsgagii* mu?k bisaatsinsiimaan, *imadaannistsii* anii *ixtsabinam igitsinatsi i_tsisixibiip* Astamatsugiww *matsidagabiistutsimya* anii *Iyiinapsgagii ino?bugii* *Axisdanitsip* miistsk *amustsk utsidomAda~kibowI* bisaatsinsiimaan. anii *nAxgesstsi isxgaxix* madAniip *idessuga?gitsiip* agitsxiniip *niduxge niduyanistsiww nidanistsii aginsdIsi* anii *ixistsabiisin* *awawo?biww Asatsisaa* ani?k agooxtsiimaan.

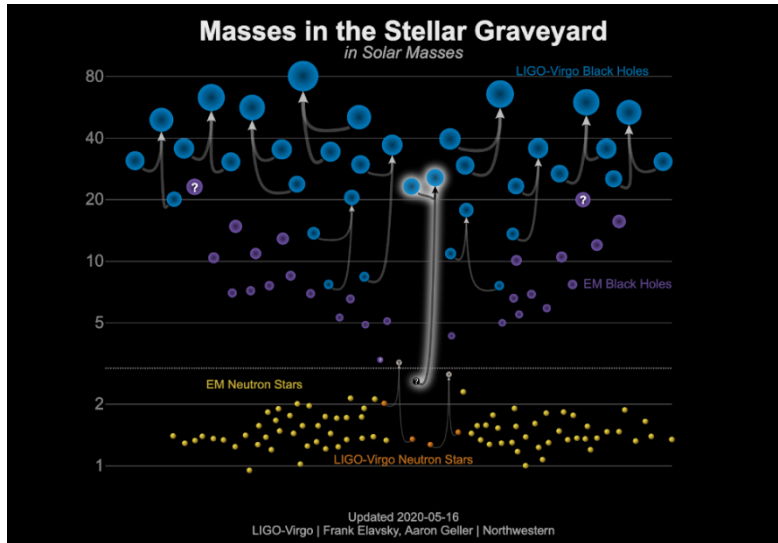
i *batsidanistsiww Aximsdanyup* manistsinim itu?bugabistutsii miix *bugutsitsbiixiya-gagadusii itspabiists, gyamusts* *essxgatsiip igagawuya* *bugutsitsbiixiya* gagadusii *gyamustsk babusuxbiisiiists axiibiisabesspabii, essgaganigiyya* nitsuuxstuup *tsaaganisduma?guu* utsitsgago *spiguyis* amustsk *bugutsitsbiixiya* gagadusii *axisinotsiip*. amustsk *iigayissxiniipiists* *udaxiima* amuu *ixa?ku*tsi o?ganstsiya* Iyinibiists *igumesugu ma?gidanisdapsii* *bugutsitsbiixiya* gagadusii, gii a?ganisdabiww *sigooxga*. *Inoganistsiww, madaganyup a?gamaabanistsiww* amu?k *GW190814* ittsiww *ixtunatsisugu bugutsitsbiixiya* gagadusii, *gyamu?k axtsino?tsawo?duup* nitsuuxstuubinaan amustsk utsitsgago *a?gitstsiya bugutsitsbiixiya* gagadusii *igagoiists*.

i dutstsiww: tsa amu?k *itsii* daan agomadabanstsiww

ibanisdabii anii sa?ku*tsi o?ganstsiya Iyinibiists *spiguyis* ittsiww amuu *itsidugesstsi nidanistsii* *bugutsitsbiixiya* gagadusii gii *sigooxga* *issxgwiipiists*, gii bi *xanistu?bugi* anii *uuda~ga utspiguyis*. *GW190814* *madanistsinim* muxsk *iibuutu?biiyatsix* *nessxgatsimya* *nixii LIGO* gii *Virgo* anu?k (*satsit sinaxin* *nisidui*). *madanistsiwwatsix* mustsk *madudAdabanistutsimya* manistsim_bya miix *ayagiiibuutu?biiya* o?ganstsiya Iyinibiists anii *spu?ts*. ma?ganistsis amustsk *iibutstsiww madagagawu* *agitsiigyabii agumanidanistsii iibuutu?biiya nadugaya* *sigooxgAsts gyl nadugaya bugutsitsbiixiya* gagadusiix. amustsgogya, *dAsubuyabanisdaya* amu?k *itsii* daaniix *idAstuwasi ixiigu* anu?k amustsk manistsinim itu?bugabistutsiiists.

agiibuut?duup amustsk *Astamatsaa* gii *Adabanyup iibuutu?biiya* *tsanidoxuu?si* ammu?k *GW190814* a?gitsigIyixiniip *niitsiwa* *uut?guunamaanuwa Aximsdaanists itsii* daan amustsk *gagadusiix iginabAstutsimya* *mixsk idabesspabiiix*, *nidanistsiximpi_da?binaan* *aasidabi spigii gagdusiix o?gonudubya* gii *ixtsiists gaxsogiwa odagiya* *axinibya odagaduumya* *ibwiiinapsiyya spu?tsiix Ade~mu?siyya a?gamaya~ku*su~ku*idodudamapsi* *agi~tu?gabiww madaganyup* *miixsk odaxinatsi o?gonudubya*, *inoganistsiww* amustsk o?ganstsiya-Iyinibii *idAstuwasi* manistsinim itu?bugabistutsii *axtsina~tu*issxgatsiip*. amu?k o?ganabi a?ga~mu*duutstsiww *gyamustsk asabu?ku*biyop* amuu *itsidesstsiww* *nadugisstsiww itsii* daan, *anisdbiiww* amustsk *essdagaduup iigayissxinim* amu?k a?gamanistsiww amustsk *essdagaduupiists* *mistsii noduyiwwI Axisdanitsip* gii o?ganstsiya-Iyinibiists *idAstuwasi* manistsinim itu?bugabistutsiiists. gii *a?gamanisdabiww* amu?k *ixa?ku*tsi* Iyinibii *miim itsii* daan *uusdu~i* a?ga~mu?duutstsiww *bitsiistui iibuutu?biiya* o?ganabii, *utsisdabis-sugusuwa iibuutu?biiya utsisganistsu*. *gyamu?k utsisganistsu* a?giduutsim anI *sigooxga* *aku*bugabessima* *gyamustsk* *Abuduuxbiisii* *aku*bugasuguma* *ixbigii* *gagadusiix ido?ganuya* anistsk *buguniists* o?gonudubya. *inoganistsiww*, *madanistsiwwatsix* amuux *nadugisstsiww* *abiistuutsiyya*.

GW190814 *aku*tsisx* *gyamustsk spiguyiists* o?ganstsiya Iyinibiists gii *aku*tsabop awAstamaatsugi* *utsibuutu?biisnuwa*. *issutsk* *Abuduuxbiisii-o?bigimskaa* *essxgamiiststsiists* *igagadamabiww* *agidesstamatsugiyya* (*gyl* *Abuduuxbiisii o?bigimskAAsts!*) *igagawu* manistsim_bya amustsk *madani~ku*guwAstsiiya iibuutu?biiya*, *gyamuu* *GW190814* *maniww* *Astamatsugi*.



sinaxin nisidui: u~tu**spiguyi*isuwaa miistsk *bugutsitsbiixiya* gagadusiix gii sigooxgaya i~tu*dessxgwiipya mustsk Abuduuxbiisii o?bigimskAAasts gii *babusuxbiisiists* *essxgatsiipya*. anistsii *uta?*gwinatsi gii *sigumo?*xinatsi sinaxin Astamatsugiya miistsk *babusuxbiisiists* issxgwiipsiniists muuxk *bugutsitsbiixiya* gagadusiix gii sigooxgaya, *maniststsiya*, *gyannistsii* *ota?*gwinatsi gii *uutsgwinatsi* sinaxin *niduyanistsiiya* anists issxgwiipiists i *do?*gwigiya Abuduuxbiisii o?bigimskAAasts. gyamuu *Iyiinapsagii*, GW190814, *suxin*AAsinuwa anii *datsiga* sinaxin amu?k *iibuutu?*biia sigooxga gii *xisdapsxinimya* Iyiniibiists utspiguyis *utsitsgu*-ma?xim, *aganyup* *nuuxgaya* nadusiix ana nadus, gyamu?k no?ganabiww i_tu*dabissduduwa matstsigi sigooxga.

ibuwa?sinow

o?ganstsiya Iyiinapsagii : *stunatsixbigii* Iyiniibiists, *niduyanistsiya* xixinatsi bugidabiya, *bugutsitsbiixiya* gagadusiix gyl sigooxgaya, amustsk agomada~psti aku*xibAdabiyop amuu gagadusi'.

sigooxga : amuu o?ganstsiya Iyiniibii *stunatsixbigii* anatsi *mada~ku**~gudAxibugitsabixsup anii abuduuxbiisii Agidudwitsii *dop*.

bugutsitsbiixiya gagadusi : *iixgunadapsii* *stunatsixbigii* o?ganstsiya Iyiniibii Apstsiixisamuu amuu *axissiiixsini*_ga amuu *stunaduma?*gu gagadusi.

M_⊙ : *nitsixga* nah *nadussiwa* gii anistsiiw *essxgwiipiists* mu?k axiibiisabesspsabii, idumanistsiiw Adamaagidutstsi 2×10^30 kg.

spiguyiists iinaxigawestsii : amuu iinaxigawestsii sigooxga manistsim_bya i~tuduuxsinimya igago *essxgamiiststsiists* miistsk o?ganstsiya Iyiniibiists utspigiists *itsidugesstsi* 2.5 gii 5 M_⊙.

s~bii i bugAni_gi/Abuduuxbiisii i desstsiimobya : Abuduuxbiisii o?bigimskAAasts abatseeiiduyiia aganyup *Astabu~ma?*gu buguniists 'bugwinatsi i *bugAni_gi*.' S~bii i *bugAni_gi* anis*abanyusin* agibuuduutsiip *utsitsxtsi*w *nidAni_gaduup*. *itsitsiya* muustsk *istsgaabiists* *nidAni_gaduumya* i *desstsiimobya*. *igixtsigaabiya*, *madAnuwaya* gii *igagoya* gii Abuduuxbiisiiya.

Axtsiku*bi : *manisto?*bi_p, amuux sigooxga *agidodaku**biya nu?*gitsi* nuu?gidanistsii anii matstsigiya nadugisstsi nu?*gadodaku**biya, anis*adabiww* amuu *gaxsogiwa* nu?*gado~da?*bi (Axtsiku*bi) anii *udAda*-pu*bisuwa agnyup *utsitsga?*sitsiip.

anatsi-agesduuyi(fists) : amuu?k anatsi *niidessxgwiip* tsaaganistsisamuu *agitsibabawa*-wa?ga agesduuyisin, idumaanistsii aganyup gibui *ixsigaasi* *ixsigaasi* kilometers.

stunatsiyuu (Mpc) : mu?k *idu?*ganistsii myanistsiyuusin idumanistsii aganyup nyuxge *ixsigaasi* anatsi *abawa*-wa?ga *issduyiists*.

mo?xinatsi agu?gitsii : *axistabawago* o?bigimskaa *iixinnuyii* (mustsk *ayu?*tsipiists, anatsiists, gyl Abuduuxbiisii o?bigimskAAasts) i *do?*gabiiya *manistabesstsiibi* gii amuu *madabi idAbuyii*. *ni_gI* itstsiw anisduup Doppler anis*desstsiw*, *agidayisstsiwada* *isstsAnagaasi*, *igotsistsxku*dagu* *Abu?*sabesstsiisi gii *itsxisdapstsi* *madu**kiixku*dagu. *amu**gl i *dawaniya* muu *spu?ts Astabu~ma?*gu, Iyiniibiists *imadanisdAtsiya* gagadusiix, *isstsiga*, gii *spu?tsiists* *uutsipsiidamiss*, *ayiidapstsiya*, gii anatsi gii *matstsigi* *babusuxbiisiists* abatseeiiduyii i *dotsiya* *agAstabenyii* o?bigimskaa *iixinnuyii*.

oduxtsiists o?gonudubya : *gyasigutsiipiists* buguniists o?gonudubya *nobutstsiya* gagadusiix odagaduumya *spu?tsiix*. *oduxtsiists* o?gonudubya itstsiw aganyup *ixsigaasi* gagadusiix.

ihwiincedabii spu?tsiists Ade~mu?sii : *ixstunadessuguya* gii *ixstunadAbyanatsi* *agi*-tu?guniipya *statsigiix* amustsk *spu?ts* *utsiidamiit*. anistsiya *ixstunatsgunadabiya*, *madabo?*bi *iesstuumskuutsp* *uutsu?guunimanuwa* *spu?ts*.



Blackfoot Translation By: Sharon Yellowfly (Siksika Nation)

This Blackfoot translation of a LIGO-Virgo Science Summary was made by Sharon Yellowfly (daughter of Percy Yellowfly & Cecile Yellowfly [Sleigh] & mother of LSC member, Corey Gray). Sharon grew up in the Little Washington community of the Siksika Nation in Alberta, Canada. Blackfoot was her first language. She began working on making a Blackfoot Dictionary in the 1970s when she noticed the pool of fluent Blackfoot speakers declining and not many language resources available. Her dictionary (& the Blackfoot Pronunciation Guide below) come from her language work during her life. Her translations for the LIGO-Virgo Scientific Collaboration inspired her to continue work on her Blackfoot dictionary and update it with scientific terms.

She made her dictionary for her children.

In recent decades there has been a revitalization with Indigenous language work, and there is now Blackfoot language curriculum available and used within and outside of the Blackfoot Confederacy of Alberta/Montana. You will notice variations in this current curriculum and Sharon's dictionary. Sharon made her dictionary utilizing her B.A. in Anthropology & background in linguistics. Sharon's dialect & translation come from both "old style" & contemporary Blackfoot; additionally, it will be how it is spoken in a dialect/accent from Little Washington in Siksika Nation. Sharon is very happy to see the resurgence in Blackfoot language, and is very proud of all the teachers teaching our language to Blackfoot youth.

Blackfoot Pronunciation Key For Vowels, & Other Symbols:

<u>BLACKFOOT</u>	<u>ENGLISH</u>
a	<i>f<u>a</u>ther</i>
i	<i>e<u>a</u>t</i>
u	<i>b<u>oo</u>k</i>
e	<i>l<u>e</u>t</i>
o	<i>g<u>o</u></i>

x - <i>s<u>i</u>x</i>	? - glottal stop
A - <i>a<u>c</u>orn</i>	<u> </u> - as in ' <i>h<u>e</u></i> ' but held a little longer
I - <i>i<u>c</u>e</i>	* - <i>wh<u>o</u></i>
	~ - (not quite a full glottal stop) as in ' <i>c<u>o</u>tt<u>o</u>n'</i>
	[bold & italics] - inflection