



GW190521: *stunaduma?gu* sigooxga o?batsuutsii *nessxgatsiip* anu?k xiistsigui

tsisdabiiw *nitsxgatsibinaan*

ani_k abitsisigadus *natsibuinitsigubudui*, 2019, nixi [Advanced LIGO](#) gii [Advanced Virgo](#) itu?gutsiisaduubyuyix *nessxgatsimya* anii Abuduuxbiisii-o?bigimskaa *Iyiinapsgagii* i_tu*dudabiiw *udAbuutu?biisiiya* amuux *bisadaabiya nadugaya sigooxgaya*. mu?k *Iyiinapsgagii*, *nitsini_gaduup*, GW190521, *isa~ku*tsitsiiw* manistsisamsi, gii istu?ganesbii *nAsiinu?dam Ase~tsiku*dagu*, notsitsgaduumya *matsstsiigiists* nadugisstsii sigooxgaya *iibuutu?biisix* *essxgatsibiists* nu?k xiistsigui.

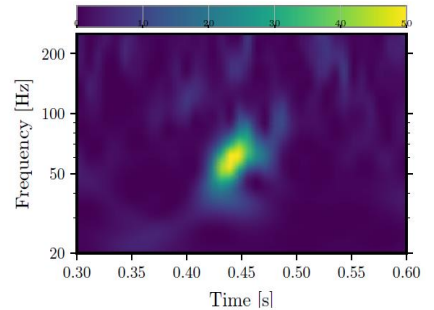
manistsisamu iku*bugiiw amu?k *Iyiinapsgagii* i_tu**duutstsiw* nadugisstsii sigooxgaya mistsk *idAgaxsiya* isxgwiipiists *oxdagyupya* *Asetsiku*dagu* nixi Advanced LIGO gii Advanced Virgo aganyup *nawabuku*tsiya mani~ku*guu* *agidessatsiip* *sabanistsii* utspiguyisii anii nadugisstsii *itsii_daan*. gya~mu?k GW190521 manistsisamsu*bii *stunatsi-gamsi*, *inoku*sa~ku*tsitsii* mi_k [GW150914](#) - *nodumu?guunim*mya amustsk nadugisstsii sigooxgaya *iibuutu?biia*. idumanistsii, *utsidAsetsiku*dagu* gyamustsk nadugisstsii sigooxgaya *iibuutu?biia* *Iyiinapsgagii* *agidutstsi* manistsuu *inoganistsii* *nawabuxtsi*

uu?babiixinsin anii nadugisstsii *sabanistsii* *spiguyis*. gyamu?k GW190521 istu?ganesbisin *Asetsi~ku*dagu* *gagidutstsi* *neeebuu* Hz, *igu~tsits~ku*tsennisi* mi_k GW150914 utu?ganesbisin *Asetsi~ku*dagu* *niduxdumya* *giibuibuitsisitsipi* Hz. *nAsuxxinimya* *udomadababis* (satsit *sinaxin* *niduxge*) nixi LIGO gii Virgo *neganudagiya* *ixstunaduma?gu* *nadugaya* sigooxga.

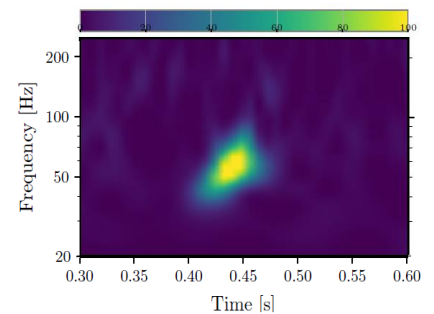
sinaxin *naduge* *awAstama~tsugi* miistsi *agessxgwiipya* *spiguyiists* gyamustsk sigooxgaya i_tu**daabiiw* GW190521. annI *utsitsgu~ma?gu* amustsii *nadugaya* sigooxgaya aganyup *notsitsgu~ma?gaduum* *naniisibuu* (85) [nadussiwa](#) [manistsspiguyis](#) (anis*dAsiinutsiip* M) *imadaannistsii* annI *buxii* sigooxga *missgiduutstsiw* *neeebuu* (65) M. *niduyya* amustsii *igutsitsguma?guya* niistsi *iibutstsiigiists* sigooxgaya *oo?gutsiisaduumyatsix* [nixii](#) [LIGO gii Virgo anu?k](#) - *gyan~nI* *utsits~ku*bugiiw* sigooxga *agAsamo~ma?xim* *ayessxgatsibiists* *igagawuya* *utsisganistsuya* sigooxgaya *agomadabanstsiisiya* miistsk *iibutstsiisiists* o?ganabiiya (satsit *sinaxin* *nuuxge*).

annI GW190521, *agAxisdaabiiw-iibuutu?biia* *utsisganistu* sigooxga “*idesuga?gitsim*” aganyup *gibibuiitsisibuugitsistuuga* M, *am~u?gl* *iixsuku*tsitsiiw* amustsk LIGO-Virgo *estsinisabaduumya* *ixstunaduma?guya* sigooxgaya. amu?k *utsisganistu* *spiguyis* *notsits~ku*bugi* *nanisuiM* *ayo?ganesatsiip* amux *Abuutsdugibya* *mannistsspiguyi* anistsi *nadugaya* sigooxgaya *iibutstsiia*; amu?k *spiguyis* no?gitsiiw i_tu~*tudawabiistutsiip* anii *esstuumskuutsp* mustsk *Abuduuxbiisii-o?bigimskaa* *Iyiinapsgagii*.

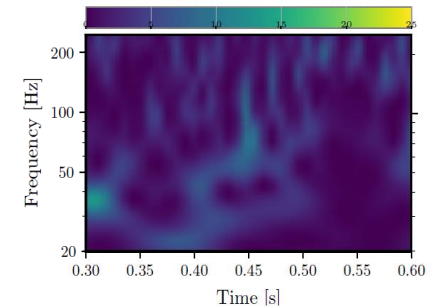
Hanford



Livingston



Virgo



sinaxin *niduxge*. *manistAsamu-Asetsi~ku*daxin* *awanitsxgwiip* i_ *desapu*dayup* i_ *desxgagyup* amustsk *agooxtsiimaaniists* anii GW190521 *Iyiinapsgagii*, *nessxgatsimya* nixi LIGO Hanford (*itspsti*), LIGO Livingston (*datsiga*), gii Virgo (*xiiu?ts*). *manistsisamu?ts* *udAdudu?ts* 03:02:29 UTC ni_k abitsisigadus *natsibuinitsigubudu~I*, 2019. anii *esstuumskuutsp* *manistAsamu-Asetsiku*daxin* *itsiina* *motsinatsiists*. *isxgatsiik* anii *Iyiinapsgagii* *iku*sa~ku*tsitsii* *manistsisamu* gii *utsitsganesbii* *udAsetsi~ku*daxin* *itstsiw* *neeebu* Hz. (gyamu?k i_tu**duutstsi* *nigAsinAbinaan* [GW190521 no?guniip](#) *sinaxin*)



Visit our websites:

<http://www.ligo.org>

<http://www.virgo-gw.eu>

maxgodudamabiiw mu?k GW190521?

bisadabiiya *iguma*?gu utspiguyistsi niisti sigooxgaya i *dutstsii* amu?k GW190521 agutsitsxima *essdaadansup*; a~ka?tsiya anu?k *tsanidotsistabitsiip* amustsk sigooxga manis*dab*Astutsipya gii agitsspumi_daya mu?k itstsi *igayiguu madaagabuudaxin* axsugutsistabitsiip *tsanidaabodagi* amu?k Abuduuxbiisii.

abAstutsiip u~ma?guya sigooxgaya

idabesspsabiix *odudamtsimya* sigooxgaya manis*dess*spiguyiisga. *ududamabi* ibanisdabiiw amustsk sigooxgaya *ayu?*gitsiia anistii *spiguyiists* i ~tu**dess*xgatsaya Asabaduumya i ~tu**domadabanstsiya* nu?gitsiya.

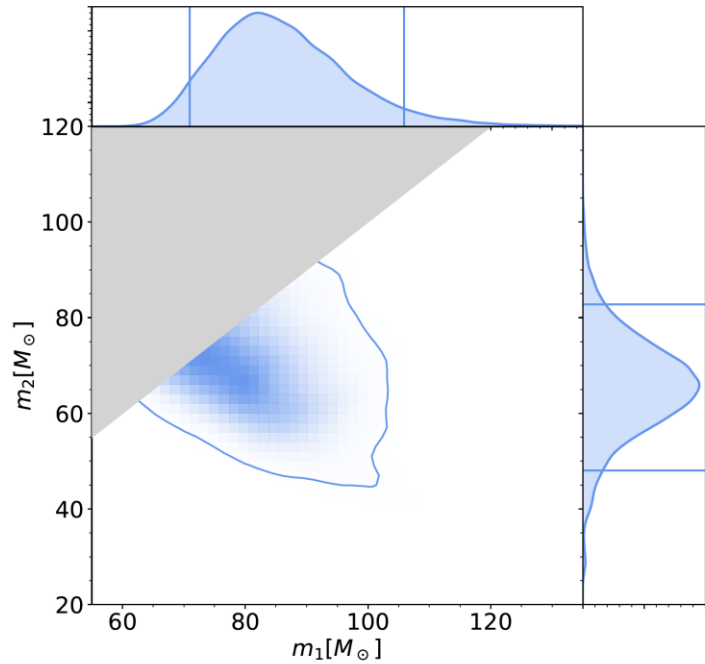
*gyamuustsk statsiguyuu?*ts spu?ts *utsiidamiit*, *igagawuya*, *itstsiya* aganyup, *“iixstunado~ma?guya”* sigooxgaya u~tu**spiguyisuwa* notsitsxtsiya *giibii*buu gyI niiduuna?gudaxin gyI agatsistabuma?guxdaxin *utsitsgu~ma?guya nah nadussiwa*.

gistunnuun uunnigiyabi mu?sugu spu?ts *utsiidamiit* itstsi mu?k [sigooxga itsstatsiguyuyi](#) aganyup mani~ku*gu *notsitsguma?*xim *nisui* mistabu~ma?guxdaxin *nah nadussiwa* manistsspiguyis. tsa amustsk *Adabyuyi* sigooxgaya *igomadabanstsiya* ixumitsidatstsiw. *agidayesxgatsiip*, manis*dA*stuwasi *a?*gamidumatstsiya anuum spu?ts *utsiidamiit sagyAnaxtsim gyanimI iixisamuu* muxsk sigooxgaya *idumadabi* gya~nu?k *Adabu~ma?*xtsimya.

agu?gitsatsip Asabaduumiists itstsiya [“gagaduusi spiguyi” sigooxgaya](#), *nidA*ximstaya *a?ku?*dotstsiya amustsk *a?g*Asi~ku*biiya miistsk statsiguyuu?ts *madanistAni_gaduupya uuma?*xspiguyiix gagaduusiix gyamui [essdunadAsAxgaaya](#). gagaduusi *spiguyi* sigooxgaya *igesspigiya* udaganistu?p aganyup namanistu gyI gibui *notsitsspigusiya* mu?k *mani~ku?*gu mah *nadussiwa*, gii *gyamustsogoya nadugayii* Iyiniibiists *agessatsimya* miistsk sigooxgaya *iibuutu?*biiya nixi Virgo gii LIGO *nessxgatsimya* a~nu?k.

siduuxstsi amustsk gagaduusi *spiguyis* gii *iixstundo~ma?guya* sigooxgaya ixumidabii *utu?uda~wu?*xinuwa niisti [“datsiga spiguyis” sigooxgaya](#), utu**spiguyiistsiists* aganyup *notsitsgaduuum* utu**mani~ku?*gu *nah nadussi* udaganistu?p *giibii*buu aganyup gibubuma?guxdaxin *nah nadussiwa*. madumAniipy *amustsk datsiga spiguyis* sigooxgaya anu?k, *iino~ku?*dessxim~staya *myaniistisii* manistomadabanstsiya. amu?k *abessgimya* amustsk *datsiga spiguyis* sigooxgaya anu?k *Ada~pu?~tu*dAbwiiinapsiya*, gyanu?k *Adapsugapsiia manistu?*dessxgatsiipiists i_do?gwiiigyup mustsk i_dA**abisabyup** gii Abuduuxbiisii o?bigimskaa itu?gutsiisaduubyuyix.

itstsiw *nidumu?*dAximstaya?binaan *otsistabidaxin bisduutsiists* *abodaxin* mistsk *spiguyi* gagaduusiix, gii mistsk sigooxgaya tsa *a?*ganis*dab*Astutsipya, *nidA*ximstaya sigooxgaya *manistsspiguyisin* statsiguyuxdaxin nAAbuuniistiidui gii *giibii*buiniboiniisidui(130) *notsitsgu~ma?*ximya *utspiguyisin* *nah nadussiwa madaku?*gu~tu**dutstsiw* anI *nAsi~ku?*bii gagaduusi. anistsiw amu?k GW190521 *Axiibagimya* ibanisdabi *annii utspiguyisin* amu?k *igutsitsguma?*gu sigooxga *nA*butstsi (uududamabii sigooxga) *iixsugobiiw* anim madadu?gaabi amu gagaduusi *nAsi~ku?*bii madanistsiw i_tu*dAA**adabiya** sigooxgaya - gii madanistii *Apstsiixisamuu-iibuutu?*biiya *utsisganistu* sigooxga i_do?gwidabitsip *agidanisduup datsiga spiguyis* sigooxga.



nitsini_gaduup GW190521 *Astamatsdumya a?*gamaniststsi niitsdummya. *awaniya* nixi LIGO-Virgo *udessxgatsisin, nida~pu?*tsuuxtsin *utspiguyisinuwa* amustsk sigooxga *ogaduumya i?xiibuu matsidabiduutstsiw giibibo a?*gamaniststsi itstsiw bisduu?ts amuu *mutsinatsi uutsgwinatsi nayumuxtsii* anii *statsigi uugagyabiidei_dagyasin* (*Astamats~tu?xin nA*buutstsiys *a?*gamaniststsi *niduyiists spiguyiists*). nu?ga~danistii *iimanapsin* amui *igamutsinaxin em*mixgAstsi *gyanni* matstsi *nAxgesstsi nitsinam~mya* essduyi-uustumee *nayumuxtsii agitsatsiip itu?gidesstsi* gii *naawuu?ts* amuu *sinaxin, awAstama~tsugiya* u~tu**spiguyis* *issxgwii*bis mustsk *nitsstsiya* sigooxgaya. *gyamu igitsinatsi-matsitsiip uda~wu?*sinuwa *itsstatsigestsiamu uugagyabiidei_dagyasin* i ~yu**danistsiw* nixi LIGO-Virgo i ~tu**daabidagiya nidA*ximstaya amui “niitstsi” *spiguyis* *m1 essxidotstsiw gyI* *otsitsgaduuum* anii “*issxiinidaxin*” *spiguyis* *m2*. (Reproduced from Fig. 2 of our [GW190521 discovery paper](#))

LIGO-Virgo's *utsxgatsimuwan* mu?k GW190521 *idudaniya gidawayagisadupya* gagaduusiix *a~ku*gu~tu*dustsiya uuma?xspiguyiix sigooxgaya*, gyl *gyamuux*gI LIGO-Virgo sigooxgaya gyayu?giitstsiya - *nidAximstaya a?~ku*danistsiiw igagawuya a?gamig*Abuutu?biisiiya muuxisk *utsits~ku*buugiya sigooxgaya*, *gyannimI* igAstaboma?guya *Abutstsiisiya matsisigi sigooxga*. gyamu?k *nidAximstsiimaan udAdaxibutstsiisinuwa i_tu*daniistAsiia nu?gitsiists ido?*ganobisin *igamitsisi igagawuya matsisigi sigooxgaya iduutstsiya* *gyagatsitsbutsbiiya*. miixsk *idabesssabiix nu?gawaniiya nobu~tsi o?gonudubya amustsk gagaduusiix* gyl gaxsogiwa ixstsi *odaxtsiisin miistsk igAbwinapsiia spu?ts utsiidamit Ade~mu?siya* *a?gamanisdabiya mustsk nu?gitsiists ido?*ganobisin.

amu?k *nessxgatsimya* GW190521 *a?ga~mu*dudaniya amuxk datsiga spiguyis sigooxgaya uda~wu?*xinuwa amustsk igayisdabawagAdabisin anistsi utu?xinidaxua miix gagaduusi *spiguyis sigooxga iibuutu**biiya. *niduyanistsii iixstunado~ma?guya sigooxgaya gyamu?k a?gu?*gadanisdasiya.

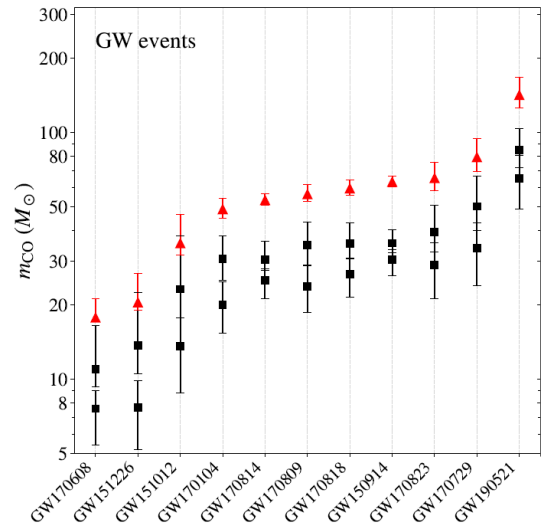
ests gyugiya otsistabitsiip amu?k Abuduuxbiisii

gyamu?k Aximsdaanists *i_tu*dotsistabitsiip manisdaabodagi* mu?k Abuduuxbiisii *i~ku**xisubuyabanisduum nam Einstein's *bisaatsinsiimaan*, gyl "GR". myanitsxiinatsstu?xiniix *i_do?*gwigiya GR *iigayisaniyu* amustsk Abuduuxbiisii-o?bigimskaa *Iyiinapsgagii i_dotstsiya iibuutu?*biiya sigooxgaya. *agida~ku**bugis, amustsk ayissaniyaxin *i_tido?*gwigiya *ma?*gidessxgatsisa niistsi Virgo gii LIGO *agooxtsiimaan*sin. *madanistsiiw, amustsk* o?gwisxgiinipiists mustsk Abuduuxbiisii-o?bigimskaa *Iyiinapsgagii a~ku*do?*gwigiya *ma?gido?* *essanisdustsiya* amustsk *ayissani i_tu*dustsiiw* mu?k Aximsdaanists, gii *agitsatsimya igamidu?gitsis ni_k GR agidAstamats~tu*gi nu?gitsi Aximsdaanists mu?k Abuduuxbiisii*.

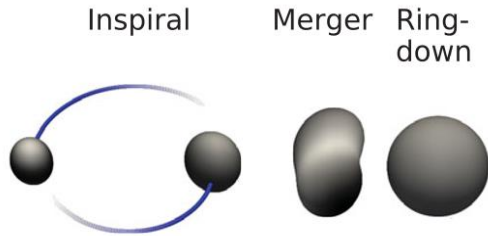
*i_do?*gwiigyup Abuduuxbiisii o?bigimskAAsts miistsk *essatsimmya tsiima ii_duutstsi* naduusi gii gagaduusiix igayiguu *madaagabuudaxiniists* matu*maaniw: *iganistsiiw* LIGO-Virgo sigooxga *iibuutu?*biiya *essxgamiststsiists* *ago?do?*gwigiyi *ma?gido?* *estsgyuya nidotsistabitsiip amu?k GR*. *maaxtsinanistsiiw* mu?k GW190521 nu?gitsiistiiw?.

amustsk Abuduuxbiisii o?bigimskAAsts *Iyiinapsgagi* o?batsuutsii *nadugaya sigooxgaya igamsababii nuuxge nu?gitsii manisttsi bya* (satsit *sinaxin nisui*): *odu~mu?* aganyup "itsabodaxinagassi", amustsk *nadugAsts* sigooxgaya *sagyayagitsstsiix* gii *oda~ku**biiya; *gyanii agitstsi* "iibuutu?biiya", amustsk *nadugAsts* sigooxgaya Abuutstsiisa; *gyannI agitstsiw* "Asetsiku*dagu agAdabAsenu?bi", *gyamui utsisganistsu* sigooxga aganyup "Asetsiku*dagusi" *annii* Asugisi Asetsiku*dagu agitsistunabi.

Ago?dAxistsibuyiya, sigooxga *Iyiinapsgagii idAniipy* niixi LIGO-Virgo *agooxtsiimaanists ayu?gitsiya* *manistAsamuu?ts, idAs~tu?*ganessbiiya nu?gitsiists *agi~tu**setsi~ku*dagu, *igamidanistsis manistumma?~ku**spiguyi miistsi sigooxgaya. *i_tu*dannistsiiw* amuxsk *itu?gutsiisaduubyuyix ixigagiiya* nu?gitsiists amustsk Abuduuxbiisii o?bigimskaa *Iyiinapsgagii, ixigagiiya manistsspiguyi annisstsi nadugisstsi*. *Iyiinapsgagiists i_do~tu*tsstsiya* madayigesspigiya sigooxgaya *igotsitsgAsuxiiniipy agitsabodaxinagassiya gii agitsibuutu?biiya*. nu?giitstsiw, *uma?xspiguyiists* amustsk sigooxgaya *i_tu*dudabii* amu?k GW190521 no?gugi *ixsugabi ixxowanitsi* anu?k *agitsatsiip abatsii utsibuutu?bisin* gii Asetsiku*dagu agAdabAsenu?bi *aku**tsabop anii Abuduuxbiisii o?bigimskaa *Iyiinapsgagii*.



--sinaxin *nuuxge*. *uugagyabiidei_dagyapsin Astamats~tu*gi* nistsi o?ganayagitsduup *spiguyiists* (anistnatsiya *sixinatsi awadaxiists*) amu?k GW190521 sigooxgaya *agitsibuutsduupya matsisigi spiguyiists mistsk* sigooxga *iibuutu?*biiya oo?gutsiisaduumya *gyamuu nixi LIGO gii Virgo's maduumstsi gii issxiinidaxin essxgatsimya oxgasaduumya, niduxge gii naduge*. *gyagiido* o?ganabi *gyamu manistsspiguyis* mustsk *nAbutstsiya xinidaxin anistnatsi mo?*xinatsi *nuxg*Agugi. *anistsiiw gyamustsk manistsiin~i_p* anI nAxgesstsi *stotsimaan Astamatsugi* udaganistsu?bi mu?k *madagumanabi* amuu *nitsuuxstuupuwa spiguyii*. *gyamu?k nAxgitsduumya spiguyisin* mu?k GW190521 *i_tu*dAniip* *uugagyabiidei_dagyasin*. (*i_tu*dustsiiw* mu?k *sinaxin gibui sinagyatsis nitsi~ni_gadup axiibisabesspsatsimmya tsimaii duutstsi nadusi gii gagaduusiix ipstsiiganisin* mu?k GW190521)



sinaxin nisui. Asinagii awAstamats~tu?gi nuuxgIyi nu?gitsii aku*tsabop amustsk Abuduuxbiisii-o?bigimskaa Iyiinapsagagii i_tu*dutstsiw udAbu~tu*biya mustsk nadugaya sigooxgaya.

gyanu?k amustsk udAnipuwa sigooxgaya Iyiinapsagagiiists, GR nAsisabugaduutsim mu?k estsgyugiya no?gugii mu?k GW190521. amuu niduxge estsgyugiya esssatsimya ayAsetsi~ku*dagu agAdabAsenu?bi datsinaku* anii Iyiinapsagagii ayagitsiiw mistsii ayo?gitsabodaxinagagsiia gii Abuttsisaya gii gyaku*gwixiniip ma?gumanistatsis. estsgyugiya sin i_tu*gwigiya ma?gi~tu*gwissxiniisa matsstigiists amustsk Iyiinapsagagii iigayissxinimya udayaganistsiip iximsdaansin mu?k Abuduuxbiisii, gii agidestsgyagiya matsstigi awayagisspduup (aganyup nu?gitsstsiists mu?k agidAbuduuxbiisiiya nadugaya sigooxgaya) igamidutstsiis anI Iyiinapsagagii. maatsitstsiip amustsk estsgyagiya idotsipsaagyup mu?k gyu?dugisaa~gu anii GW190521 i_tu*duutstsiw nAbuutu?biya nadugaya sigooxgaya nidAdagidaya(OBEY) amustsk essatsimya tsima ii duutstsi naduusi gii gagaduusiix agAstamatsagiya mu?k GR.

agisubuyabanigiya

GW190521 anisdabiix ixstunadu~ma?guu amu?k Abuduuxbiisii o?bigimskaa essxgatsiip ogagistudugiiya agidessatsiip tsanidabAstuttsiipa sigooxgayiix, gii ido?gugiya maaniists essxgatsiip amu?k Abuduuxbiisii istu?ganodudamabi. idudaniya a?gitstsiya manistsimi_bya niistsiya uuma?x~spiguyi sigooxga iibuutu?biya a?ga~mu?guuniimya miixi issutsik essxgatsimaanists gyaxigagimaduupiists ginii xisk LIGO (itsiinAbyaa LIGO India), Virgo gii KAGRA miim Japan.

agidesatsiip itu?ganessbii igagawuguyiists amustsk gagaduusi~spiguyi sigooxga manistsimi_bya aagessbummugiya a?gidAsuxiniip AsAxtsiku*biyax a?gidAstamats~tu?gaduup amustsk sigooxgaya, gii gyamustsk iduudesstsiya idobiya, GW190521 aga?siitsim igu?desstsi~mu?sii utastunaduma?xstsi amustsk sigooxga anu?k agAnuwAx, agu?xxinimya matsugabi madagumAstagaduup. LIGO, Virgo gii KAGRA axsagyabesatimya spu?ts miistsk Abuduuxbiisii o?bigimskAAsts gyaku*do?gwigiya sugabisduduya ixigagiistsin, gii issu?ts itu?gutsiisaduubyuyix igagutsiixuu gaasiya gii aku*tsugabiya abessatsisa xiiuu?tsiists Asetsi~ku*dagu gyaniml a?gamagawuya spiguyi sigooxgaya a?gamidAxsasiya. manabiix itu?gutsiisaduubyuyix anu?k itsii daanima annuyi niix Einstein i dAbiisabyup gii spu?ts abo?gwixininim anuum xa?gui, gii LISA amuu spu?ts. axgitsduup!

gida~ku*gwixiniip:

uuxisawatsduuk amuu xa?guis udubinu?sin
ogagiisdudugiya: www.ligo.org, www.virgo-gw.eu

gidaguxdup mi_k LIGO gii Virgo Asestsiists i_dAtsini~giya ni_gl
no?gunimya GW190521:

www.ligo.org/detections/GW190521/pr-english.pdf

<http://www.virgo-gw.eu/GW190521>

gidaguxdup xisduwabiya agutsiip nAsabaatstsi istsgaabiists sinaxin
Astamats~tu*gi udo?guunibuwa mi_k GW190521 :

<https://dcc.ligo.org/P2000020/public>

gidaguxdup akubugabessbi istsgaabiists sinaxin Astamats~tu*gi amu?k
axibiisabesspsatsimya tsimaii duutstsi nadusi gii gagaduusiix
anisadabanyusin mi_k GW190521 :

<https://dcc.ligo.org/P2000021/public>

Abuduuxbiisii-o?bigimskaa nAgayinniip istsgaabi nabyuyis
agooxtsiimaaniists nAbutsiip mu?k GW190521: agidutsiip annuum.



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/accents 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