Z…Zxq Aa¨vq

cÖ\_g wZwb wgwbU

BwZnvmwe`‡`i g‡Zv Km‡gvjwR÷ivI Rv‡bb, fwel¨Z Rvb‡Z n‡j ZvKv‡Z nq AZx‡Zi w`‡K| Av‡Mi Aa¨v‡q Avwg e¨vL¨v K‡iwQ, Kxfv‡e ZvcMwZwe`¨vi m~Î gnvwe‡k^i wbw`©ó eq‡mi Bw½Z w`‡”Q| cÖvq mKj weÁvbx GKgZ †h cÖvq `k †\_‡K wek wewjqb eQi Av‡M GKwU e„nr we‡ùvi‡Yi (weM e¨vs) Gi gva¨‡g gnvwe‡k^i Rb¥| Ges gnvwe‡k^i fwel¨r wbqwZ Kx n‡e †mUvI wVK n‡q †M‡Q GB NUbvi mv‡\_ mv‡\_| gnvwe‡k^i ïiæ Kx K‡i n‡qwQj Ges cÖv\_wgK `kvq GwU †Kvb cÖwµqvi ga¨ w`‡q wM‡qwQj †mUv †R‡b fwel¨r m¤ú‡K© fv‡jv aviYv cvIqv hvq|

cvðvZ¨ ms¯‹…wZwi GKwU †gŠwjK Ask n‡jv gnvwek^ wPiKvj wQj bv| wMÖK `vk©wbKiv wPišÍb gnvwe‡k^i K\_v ej‡jI cvðv‡Z¨i me¸‡jv eo ag©B e‡j‡Q, Ck^i AZx‡Zi wbw`©ó †Kv‡bv mg‡qB gnvwek^ ˆZwi K‡i‡Qb|

gnvwe‡k^i AvKw¯§K m~Pbv m¤ú‡K© ˆeÁvwbK cÖgvY LyeB †Rviv‡jv| me‡P‡q cÖZ¨ÿ cÖgvY cvIqv wM‡qwQj `~ieZx© Qvqvc\_¸‡jv †\_‡K Avmv Av‡jvi AvPiY we‡kølY K‡i| 1920 Gi `k‡K A¨v‡gwiKvb †R¨vwZwe©` GWDBb nvej ch©‡eÿY K‡i †`L‡jb, `~ieZx© Qvqvc\_¸‡jv †\_‡K Avmv Av‡jv wbKUeZx©‡`i Zzjbvq wKQzUv jvj n‡q hv‡”Q| Zvui Av‡M †f‡÷v w¯øcvi bv‡g GKRb †beyjv we‡klÁ G wel‡q `xN© w`b a‡i KvR K‡i wM‡qwQ‡jb| KvR Ki‡Zb A¨vwi‡Rvbvi d¬¨vM÷¨vd gvbgw›`‡i (observatory)| Avi nvej e¨envi K‡iwQ‡jb 100 BwÂi gvD›U DBjmb †Uwj‡¯‹vc| Gici h‡Zœi mv‡\_ jvj n‡q hvIqvi cwigvY ciwgvc Ki‡jb I MÖv‡d AvuK‡jb| †`L‡jb, GLv‡b GKwU wbqg KvR Ki‡Q| †h Qvqvc\_ Avgv‡`i †\_‡K hZ `~‡i Av‡Q, Zv‡K ZZ †ewk jvj †`Lv‡”Q|

Av‡jvi is Gi Zi½‰`‡N©i mv‡\_ m¤úwK©Z| mv`v Av‡jvi eYv©wj‡Z\* bxj is Gi Ae¯’vb †QvU Zi½‰`‡N©i cÖv‡šÍ Avi jvj Gi Ae¯’vb n‡jv j¤^v Zi½‰`‡N©i cÖv‡šÍ| †h‡nZz `~‡ii Qvqvc\_¸‡jvi Av‡jv jvj n‡q hv‡”Q, Zvi gv‡b Zv‡`i Av‡jvi Zi½‰`N¨© †Kv‡bvfv‡e j¤^v n‡q hv‡”Q| nvej Lye h‡Zœi mv‡\_ A‡bK¸‡jv Qvqvc‡\_i eYv©wji ˆewkó¨m~PK †iLvi Ae¯’vb wPwýZ K‡i G AvPiY m¤ú‡K© wbwðZ n‡jb| wZwb ej‡jb, Av‡jvK Zi½ eo n‡q hvevi KviY n‡jv gnvwek^ cÖmvwiZ n‡”Q| AwZ ¸iæZ¡c~~Y© G e³‡e¨i gva¨‡gB nvej AvaywbK Km‡gvjwRi m~Pbv Ki‡jb|

m¤úªmviYkxj gnvwe‡k^i aviYv A‡bK‡B wVKfv‡e eyS‡Z cv‡ib bv| c„w\_ex †\_‡K †`L‡j g‡b nq, `~‡ii me Qvqvc\_ Avgv‡`i †\_‡K `~‡i m‡i hv‡”Q| wKš‘ Gi gv‡b GB bq †h c„w\_ex gnvwe‡k^i †K‡›`ª Av‡Q| cÖmvi‡Yi cÖK…wZ cy‡iv gnvwek^ Ry‡o (M‡o) GKB iKg| cÖwZwU Qvqvc\_, ev Av‡iv fv‡jvfv‡e ej‡j cÖwZwU Qvqvc\_cyÄ**\*** ev ¯ÍeK (cluster of galaxies) G‡K Aci †\_‡K `~‡i m‡i hv‡”Q| G wPÎ fv‡jvfv‡e †evSvi R‡b¨ Qvqvc\_cyÄ¸‡jv gnvk~b¨ w`‡q Qz‡U hv‡”Q — Gfv‡e wPšÍv bv K‡i g‡b Kiæb, Qvqvc\_cy‡Äi ga¨eZx© ¯’vb dz‡j DV‡Q ev j¤^v n‡q hv‡”Q|

¯’vb cÖmvwiZ n‡”Q– K\_vwU we¯§qKi †kvbv‡Z cv‡i| wKš‘ 1915 mv‡j AvBb÷vBb Zvui mvwe©K Av‡wcÿKZv ZË¡ cªKv‡ki ci †\_‡KB weÁvbxiv G aviYvi mv‡\_ cwiwPZ| G ZË¡ Abymv‡i gnvKl© Avm‡j ¯’v‡bi (mwVK K‡i ej‡j ¯’vbKv‡ji) eµZv ev weK…wZi ewntcÖKvk| GK A‡\_© ¯’vb n‡jv w¯’wZ¯’vcK**\***| GwU Gi gv‡S Dcw¯’Z c`v‡\_©i gnvKlx©q a‡g©i Ici wfwË K‡i †e‡uK †h‡Z ev cÖmvwiZ n‡Z cv‡i| ch©‡eÿY †\_‡K G aviYvi c‡ÿ h‡\_ó cÖgvY cvIqv wM‡q‡Q|

wPÎ 3.1

m¤úªmviYkxj gnvwe‡k^i GKwU GKgvwÎK bgybv| we›`yMy‡jv Øviv Qvqvc\_cyÄ wb‡`©k Kiv n‡”Q| Avi w¯’wZ¯’vcK myZv w`‡q ¯’vb †evSv‡bv n‡q‡Q| myZv‡K j¤^v Kiv n‡j we›`y¸‡jv `~‡i m‡i| Gi d‡j myZvi Ici w`‡q Pjgvb †Kv‡bv Zi‡½i Zi½‰`N¨©I eo n‡e| nve‡ji Avwe®‹…Z †jvwnZ miYI**\*** Gfv‡eB KvR K‡i|

GKwU mvaviY D`vni‡Yi gva¨‡g m¤úªmviYkxj ¯’v‡bi †gŠwjK aviYv ey‡S †bIqv hvq| g‡b Kiæb, GKwU w¯’wZ¯’vcK myZvi Ici A‡bK¸‡jv we›`y Av‡Q (†`Lyb wPÎ 3.1)| we›`yM‡jv Øviv Qvqvc\_cyÄ wb‡`©k Kiv n‡”Q| Gevi g‡b Kiæb, Avcwb myZvwU‡K `yB cÖvšÍ †\_‡K a‡i Uvb w`‡q j¤^v K‡i †dj‡jb| cÖwZwU we›`y G‡K AciwU †\_‡K m‡i hv‡”Q| Avcwb †h we›`yi K\_vB wPšÍv Kiæb bv †Kb, Zvi cv‡ki we›`y¸‡jv‡K `~‡i mi‡Z †`Lv hv‡”Q| Zvi Ici cÖmviY me w`‡K GKB iKg| †Kv‡bv we‡kl †K›`ª ej‡Z wKQz †bB| Aek¨ Avwg GUv‡K GLv‡b †hfv‡e Gu‡KwQ, Zv‡Z GKwU we›`y †K‡›`ª Av‡Q| wKš‘ †h cÖwµqvq GLv‡b cÖmviY NU‡Q, Zvi mv‡\_ GB †K›`ªxq we›`yi †Kv‡bv m¤úK© †bB| we›`ymn myZvwU hw` Amxg mvB‡Ri n‡Zv A\_ev myZvwU hw` e„ËvKvi n‡Zv, Z‡e GB †K›`ªwU Avi \_vK‡Zv bv|

†h-‡Kv‡bv wbw`©ó we›`y †\_‡K wPšÍv Ki‡j †`Lv hvq, Zvi wbKUZg we›`y¸‡jv c‡ii wbKU we›`y¸‡jv †\_‡K A‡a©K MwZ‡Z `~‡i mi‡Q| Ges ZviI c‡ii wbKU we›`yM‡jv †\_‡K AviI A‡a©K MwZ‡Z mi‡Q| Gfv‡eB Pj‡Q| GKwU we›`y hZ `~‡i Av‡Q, †mwU ZZ `ªæZ m‡i hv‡”Q| G ai‡bi cÖmvi‡Yi †ÿ‡Î mi‡Yi**\*** nvi `~i‡Z¡i mgvbycvwZK**\*** | m¤úK©Uv †ek kw³kvjx| QwewU †`‡L Avgiv m¤úªmviYkxj ¯’v‡b we›`y¸‡jv, gv‡b Qvqvc\_cy‡Äi ga¨eZx© ¯’v‡b PjvPjiZ Av‡jvK Zi½i K\_v Kíbv Ki‡Z cvwi| ¯’v‡bi mv‡\_ mv‡\_ Zi½I cÖmvwiZ n‡”Q| Gi gva¨‡g gnvRvMwZK †jvwnZ mi‡Yi e¨vL¨v cvIqv hvq| nvej †`L‡jb, †jvwnZ mi‡Yi cwigvY `~i‡Z¡i mgvbycvwZK| wVK Qwe‡Z †hgbUv †`Lv‡bv n‡q‡Q †mfv‡e|

gnvwek^ hw` m¤úªmviYkxj n‡qB \_v‡K, Zvn‡j AZx‡Z wbðqB GwU AviI Romo wQj| nve‡ji ch©‡eÿY †\_‡K cÖmvi‡Yi nvi cwigvc Kiv hvq| cieZx©‡Z ch©‡eÿ‡Yi gvb AviI A‡bK DbœZ nq| nviI †ei Kiv nq AviI fv‡jvfv‡e| gnvRvMwZK wPÎwU‡K †cQ‡bi w`‡K Pvwj‡q w`‡j Avgiv †`Le, †Kv‡bv GK `~i AZx‡Z me¸‡jv Qvqvc\_ G‡K Ac‡ii mv‡\_ wg‡k Av‡Q| eZ©gvb mg‡qi cÖmvi‡Yi nvi †R‡b Avgiv Abygvb Ki‡Z cvwi †h GB wgwkÖZ Ae¯’v eû wewjqb eQi Av‡Mi K\_v| Z‡e `ywU Kvi‡Y †mB mgqwU mwVK K‡i ejv m¤¢e bq| cÖ\_gZ, wewfbœ Kvi‡Y mwVK K‡i cwigvc Kiv m¤¢e nq bv| wewfbœfv‡e fzj n‡qB hvq| Aek¨ AvaywbK †Uwj‡¯‹v‡ci gva¨‡g Av‡Mi †P‡q †ewk msL¨K Qvqvc\_ wb‡q KvR Kiv m¤¢e n‡”Q| wKš‘ Gi c‡iI cÖmvi‡Yi nvi GLbI AwbwðZ| †mUv Kgc‡ÿ `yB ¸Y ch©šÍ Kg-‡ewk n‡Z cv‡i| GUv GLbI weZ‡K©i eo GKwU welq|

wØZxqZ, gnvwe‡k^i cÖmviY nvi me mgq GKB \_v‡K bv| Gi R‡b¨ `vqx n‡jv gnvKl© ej| gnvKl© ej Qvqvc\_¸‡jvi g‡a¨ †Zv KvR K‡iB, GUv KvR K‡i gnvwe‡k^i me ai‡bi c`v\_© Ges kw³i g‡a¨I| gnvKl© †eª‡Ki g‡Zv AvPiY K‡i| Gi Kvi‡Y Qvqvc\_¸‡jv evB‡ii w`‡K Qz‡U †h‡Z evav cvq| d‡j, mg‡qi mv‡\_ mv‡\_ cÖmviY nvi ax‡i ax‡i K‡g Av‡m| Zvi gv‡b, AZx‡Z wbðqB gnvwek^ AviI `ªæZ cÖmvwiZ nw”Qj| MÖv‡d hw` mg‡qi wecix‡Z gnvwe‡k^i GKwU Av`k© GjvKvi mvBR †`Lv‡bv nq, Zvn‡j 3.2 bs wP‡Îi g‡Zv GKwU mvaviY †iLv cvIqv hvq| MÖv‡d †`Lv hv‡”Q, gnvwe‡k^i m~Pbv N‡U‡Q Lye wbweo Ae¯’v †\_‡K| Zvici †\_‡K cÖmviY NU‡Q Lye `ªæZ †e‡M| Ges mg‡qi mv‡\_ mv‡\_ gnvwe‡k^i AvqZb hZ †e‡o‡Q, c`v‡\_©i NbZ¡I wbqwgZ wfwË‡Z ZZB K‡g †M‡Q| †iLvwU a‡i †cQb w`‡K G‡Mv‡Z G‡Mv‡Z m~Pbv ch©šÍ †M‡j (wP‡Îi 0 Ae¯’v‡b) †`Lv hvq, gnvwe‡k^i ïiæ n‡q‡Q k~b¨ mvBR †\_‡K| Avi †m mgq cÖmviY nvi wQj Amxg| Ab¨ K\_vq, Avgiv AvR †hme Qvqvc\_ †`LwQ, G¸‡jv †h c`v\_© w`‡q ˆZwi †m¸‡jvi m~Pbv n‡q‡Q Zxeª MwZi GKwUgvÎ we›`y †\_‡K| Z\_vKw\_Z weM e¨vs Gi GwU GKwU Av`kv©wqZ weeiY|

wPÎ 3.2

wP‡Î †hgbUv †`Lv‡bv n‡jv, A‡bKUv †mfv‡eB gnvwe‡k^i cÖmviY nvi mg‡qi mv‡\_ mv‡\_ wbqwgZ wfwË‡Z K‡g Av‡m| mij G bgybvq mg‡qi A‡ÿi k~b¨ we›`y‡Z cÖmviY nvi Amxg| G we›`ywUB weM e¨vs Gi mgq wb‡`©k Ki‡Q|

wKš‘ †iLvwU‡K †cQbUv ch©šÍ †U‡b hvIqvi wPšÍvUv KZUzKz †hŠw³K? A‡bK Km‡gvjRw÷ g‡b K‡ib, KvRUv wVKB Av‡Q| †h‡nZz Avgiv AvkvB KiwQ †h gnvwe‡k^i GKwU ïiæ Av‡Q (Av‡Mi Aa¨v‡q Av‡jvwPZ KviY¸‡jvi mvnv‡h¨) AZGe, wbwðZfv‡e g‡b n‡”Q †mUv weM e¨vsB n‡e e‡j| hw` †mUvB nq, Zvn‡j †iLvi m~Pbv we›`ywU †hb‡Zb †Kv‡bv we‡ùviY bq| g‡b ivL‡Z n‡e, GLv‡bi MÖvdwU‡Z †Lv` ¯’v‡biB cÖmviY †`Lv‡bv n‡q‡Q| AZGe, k~b¨ AvqZ‡bi A\_© ïay GUvB bq †h c`v\_© Amxg Nb‡Z¡i ¯’v‡b ¸wU‡q Av‡Q| Gi AviI A\_© n‡jv, ¯’vb ¸wU‡q Av‡Q k~b¨Zvi (nothing) gv‡S| Ab¨ K\_vq, weM e¨vs GKB mv‡\_ ¯’vb Ges c`v\_© I kw³i m~Pbv| GLv‡b GKwU ¸iæZ¡c~Y© K\_v eyS‡Z n‡e| G aviYv Abymv‡i Av‡M †\_‡K Ggb †Kv‡bv k~b¨¯’vb wQj bv, †hLv‡b weM e¨vs N‡UwQj|

mg‡qi m¤ú‡K©I GKB K\_v ejv P‡j| c`v‡\_©i Amxm NbZ¡ Ges ¯’v‡bi Amxg ms‡KvPb mg‡qiI GKwU mxgvbv †eu‡a †`q| KviY, gnvKl© mgq Ges ¯’vb `y‡Uv‡KB j¤^v K‡i †`q| GUvI AvBb÷vB‡bi mvwe©K Av‡cwÿKZv Z‡Ë¡i GKwU djvdj| cixÿvg~jKfv‡e Gi mivmwi cÖgvYI cvIqv †M‡Q| weM e¨vs Gi cwi‡ek ej‡Q, ¯’v‡bi weK…wZ wQj Amxg| d‡j weM e¨vs Gi Av‡Mi mgq (Ges ¯’vb) Gi aviYv GLvb †\_‡K cvIqv hv‡”Q bv| d‡j Avgiv wm×všÍ wb‡Z eva¨ nw”Q †h weM we¨vsB n‡jv mKj †fŠZ wRwbmÑ ¯’vb, Kvj, c`v\_© I kw³i P~ovšÍ m~Pbv| G cÖ‡kœi †Kv‡bv AeKvk †bB (hw`I A‡b‡KB cÖkœwU K‡i \_v‡Kb) †h weM e¨vs Gi c~‡e© Kx N‡UwQj? A\_ev †KbB ev we‡ùviYwU N‡UwQj? c~e© ej‡ZB wKQz wQj bv| Avi †hLv‡b mg‡qiB Aw¯ÍZ¡ †bB mvaviY A‡\_© Kvh©KviY ej‡ZI wKQz \_v‡K bv|

gnvwe‡k^i m~Pbv m¤ú‡K© weM e¨vs Z‡Ë¡i e³e¨¸‡jv A™¢~Z| Z‡e weM e¨vs Gi cÖgv‡Yi R‡b¨ hw` gnvwe‡k^i cÖmvi‡Yi IciB wbf©i Kiv n‡Zv, Zvn‡j m¤¢eZ A‡bK Km‡gvjwR÷B G‡K †g‡b wb‡Zb bv| wKš‘ 1965 mv‡j ZË¡wUi c‡ÿ ¸iæZ¡c~Y© AviI cÖgvY Gj| Rvbv †Mj, cy‡iv gnvwek^ Zvcxq wewKi‡Y cwic~Y©| gnvk~b¨ †\_‡K Avmv G wewKiY weM e¨vs Gi Aí mgq c‡ii| Avm‡Q AvKv‡ki me w`K †\_‡K GKB ZxeªZv wb‡q| Ab¨ wKQz Øviv GwU evavMÖ¯’ nq bv ej‡jB P‡j| d‡j GwU Avgv‡`i mvg‡b Avw`g gnvwe‡k^i Ae¯’vi GKwU wPÎ Zz‡j ai‡Q| GB Zvcxq wewKi‡Yi eYv©wji mv‡\_ ZvcMZxq mvg¨ve¯’vq †cŠuQv GKwU Pzwjøi DËv‡ci ûeû wgj i‡q‡Q| G ai‡bi wewKiY‡K c`v\_©weÁvbxiv e‡jb K…òe¯‘ wewKiY**\***| d‡j Avgiv eyS‡Z cviwQ, cÖv\_wgK gnvwek^ Ggb GKwU mvg¨ve¯’vqB wQj| me©Î ZvcgvÎv wQj GKB iKg|

GB cUf~wg Zvcxq wewKiY cwigvc K‡i Rvbv †Mj, Gi ZvcgvÎv n‡jv cig k~b¨ ZvcgvÎvi †P‡q cÖvq wZwb wWwMÖ †ewk (cig k~b¨ ZvcgvÎv n‡jv gvBbvm 273 wWwMÖ †mjwmqvm)| wKš‘ mg‡qi mv‡\_ mv‡\_ ax‡i ax‡i ZvcgvÎvi cwieZ©b nq| cÖmvi‡Yi mv‡\_ mv‡\_ GKwU mij m~Î †g‡b gnvwek^ VvÐv n‡Z \_v‡K| e¨vmva© wØ¸Y n‡j ZvcgvÎv A‡a©‡K †b‡g Av‡m| GB kxZjxKiY cÖfve Avi Av‡jvi †jvwnZ miY GKB wRwbm| Zvcxq wewKiY Avi Av‡jvÑ`y‡UvB Zwo”Pz¤^Kxq Zi½ Øviv MwVZ| Ges gnvwe‡k^i cÖmvi‡Yi mv‡\_ mv‡\_ Zvcxq wewKi‡Yi Zi½‰`N¨©I eo n‡Z \_v‡K| D”P ZvcgvÎvi †P‡q wb¤œ ZvcgvÎvi wewKi‡Yi Zi½‰`N¨© (M‡o) A‡cÿvK„Z eo nq| Avevi, D‡ëv K‡i †`L‡j Avgiv †`wL, AZx‡Z gnvwek^ Aek¨B A‡bK †ewk DËß wQj| GB wewKi‡Yi m~Pbv N‡UwQj weM e¨vs Gi wZb jÿ eQi c‡i| †h mgq kxZj n‡Z n‡Z gnvwe‡k^i ZvcgvÎv †b‡g G‡mwQj cÖvq 3000 wWwMÖ †mjwmqvm-G| Gi mg‡qi Av‡M g~jZ nvB‡Wªv‡Rb w`‡q MwVZ Avw`g M¨vm wQj AvqwbZ cøvRgv**\*** AvKv‡i| G Kvi‡Y †m mgq G M¨v‡mi †fZi w`‡q Zwo”Pz¤^Kxq wewKiY mÂvwjZ n‡Z cviZ bv| ZvcgvÎv Kg‡j cøvRgv mvaviY (A-AvqwbZ) nvB‡Wªv‡Rb M¨v‡m ciwYZ n‡jv| wewKiY Gi ga¨ w`‡q mÂvwjZ n‡Z cv‡i| d‡j wewKiY Gevi gy³fv‡e Qwo‡q co‡Z ïiæ Kij|

cUf~wg wewKiY GKUz Avjv`v| †mUv ïay Gi eYv©wji K…òe¯‘i g‡Zv AvPi‡Yi R‡b¨B bq| AvKv‡ki me w`‡K GwU `viæYfv‡e GKB iKg| gnvk~‡b¨i Avjv`v w`‡K GB wewKi‡Yi ZvcgvÎvi cv\_©K¨ gvÎ GK jÿ fv‡Mi GK fvM| GUv †\_‡K †evSv hvq, eo gvcKvwV‡Z wPšÍv Ki‡j gnvwek^ D‡jøL‡hvM¨fv‡e mgagx©| KviY, ¯’v‡bi †Kv‡bv GKwU AÂ‡j ev wbw`©ó †Kv‡bv w`‡K hw` c`v\_© wbqgZvwš¿Kfv‡e cywÄf~Z n‡Zv, Zvn‡j ZvcgvÎvi cv\_©K¨ †`Lv †hZ| Ab¨ w`‡K Avgiv Rvwb, gnvwek^ cy‡ivcywi mylg bq| c`v\_© GKxf~Z Qvqvc\_ ˆZwi n‡q‡ Av‡Q| wewfbœ Qvqvc\_ wg‡j Avevi ˆZwi nq K¬v÷vi ev ¯ÍeK| GB K¬v÷viiv Avevi ˆZwi K‡i mycviK¬v÷vi| eû wgwjqb Av‡jvKe‡l©i gvcKvwV‡Z gnvwe‡k^i AvK…wZ A‡bKUv †dbvi g‡Zv| wecyj cwigvY k~b¨Zvi gv‡S gv‡S Qvqvc\_ Zš‘i Dcw¯’wZ|

wPÎ: 3.2.1

(Qvqvc\_ Zš‘i (Galaxy filament) †Pnviv eo gvcKvwV‡Z 3.2.1 wP‡Îi g‡Zv| GwU n‡jv gnvwe‡k^i Rvbv KvVv‡gv¸‡jvi g‡a¨ me‡P‡q eo| ˆ`N¨© n‡Z cv‡i 16 †KvwU †\_‡K 26 †KvwU Av‡jvKel© ch©šÍ| -Abyev`K)

eo †¯‹‡j gnvwe‡k^i GB ¸”Qe×Zv cÖviw¤¢K gm„Y Ae¯’v †\_‡KB †Kv‡bvfv‡e Rb¥ wb‡q‡Q| Gi †c‡Q‡b A‡bK¸‡jv †fŠZ KviY \_vK‡Z cv‡i| Z‡e me‡P‡q fv‡jv e¨vL¨v n‡jv axi gnvKl©xq AvKl©Y| weM e¨vs ZË¡ mwVK n‡q \_vK‡j ¸”Qe× nIqvi cÖwµqvi cÖv\_wgK Ae¯’vi wKQz cÖgvY gnvRvMwZK cUf~wg wewKi‡Yi g‡a¨ \_vKvi K\_v| 1992 mv‡j **†Kve** (COBE ev Cosmic Background Explorer) bv‡g bvmvi GKwU K…wÎg DcMª‡ni gva¨‡g Rvbv hvq, wewKiY cy‡ivcywi gm„Y bq| AvKv‡ki GK w`K †\_‡K Av‡iK w`‡K G‡Z my¯úó Q›`cZb †`Lv hv‡”Q| A\_ev †`Lv hv‡”Q ZxeªZvi DVv-bvgv| GB ÿz`ª ÿz`ª Q›`cZb¸‡jvB mycviK¬v÷vi‡`i MVb cÖwµqvi wbwe©Nœ m~Pbv K‡iwQj| G wewKiY Avw`g ¸”Qe×Zvi wPý Av¯’vi mv‡\_ a‡i †i‡L‡Q| †mUvI Avevi eû Kvj hveZ| Gi MÖvd ej‡Q, AvR Avgiv †h m„k„•Lj ¯^Zš¿ gnvwek^ †`LwQ, GwU me mgq Ggb wQj bv| ïiæ‡Z gnvwek^ wQj cÖvq cy‡ivcywi mylg Ae¯’vq| GKwU j¤^v weeZ©‡bi gva¨‡g c`v\_© cyÄxf~Z n‡Z n‡Z cieZx©‡Z Qvqvc\_ I bÿ‡Îi Rb¥ nq|

DËß Nb Ae¯’v †\_‡K gnvwe‡k^i Rb¥ nIqvi mc‡ÿ Av‡iKwU P~ovšÍ cÖgvYI Av‡Q| AvR‡Ki w`‡bi Zvcxq wewKi‡Yi ZvcgvÎv †R‡b Avgiv mn‡RB wnmve K‡i †dj‡Z cvwi †h R‡b¥i cÖvq GK eQi ci gnvwe‡k^i meLv‡b ZvcgvÎv wQj cÖvq GK nvRvi wWwMÖ †mjwmqvm| GB ZvcgvÎv GZUvB †ewk †h G‡Z †hŠwMK cigvYyi †K‡›`ªi c‡ÿI wU‡K \_vKv m¤¢e bq| †mB mgq e¯‘ Aek¨B Gi me‡P‡q †gŠwjK Dcv`v‡b wef³ wQj| d‡j G mgq †cÖvUb, wbDUªb I B‡jKUª‡bi g‡Zv †gŠwjK1 KwYKviv wePiY KiwQj \_‡i \_‡i| wKš‘ ZvcgvÎv GKUz Kg‡j wbDwK¬xq wewµqv NUv m¤¢e nj| we‡kl K‡i †cÖvUb I wbDUªb gy³fv‡e †Rvovq †Rvovq hy³ nevi my‡hvM †cj| †kl ch©šÍ GB †Rvov¸‡jvB hy³ n‡q wnwjqvg cigvYyi †K›`ª (wbDwK¬qvm) MVb K‡i| wnmve K‡i †`Lv †M‡Q, GB wbDK¬xq cÖwµqv¸‡jv PjwQj cÖvq wZb wgwbU a‡i (Gi Ici wfwË K‡iB w÷‡fb DBbev‡M©i eB‡qi bvg w`‡qwQ‡jb `¨ dv÷© w\_ª wgwbUm)| GUzKzb mg‡qi g‡a¨ cÖvq Pvi fv‡Mi GK fvM cwigvY c`v\_© wnwjqv‡g cwiYZ nq| G‡Z K‡i Dcw¯’Z me¸‡jv wbDUªb KYv †kl n‡q hvq| d‡j Avi †Kv‡bv Dcvq bv †`‡L evwK me Ahy³ †cÖvUb¸‡jv nvB‡Wªv‡Rb2 wbDwKøqv‡m cwiYZ nq| Zvi gv‡b ZË¡ ej‡Q, gnvwe‡k^ cÖvq 75 fvM nvB‡Wªv‡Rb I 25 fvM wnwjqvg \_vKv DwPr| eZ©gvb mg‡qi wnmve-wbKv‡ki mv‡\_ GB e³‡e¨i Lye fv‡jv wgj cvIqv †M‡Q|

Avw`g †mB wbDK¬xq wewµqvq m¤¢eZ mvgvb¨ cwigvY wWD‡Uwiqvg3, wnwjqvg-3 Ges wjw\_qvgI ˆZwi n‡qwQj| Z‡e fvix †gŠj¸‡jv weM e¨vs Gi mgq ˆZwi nqwb| gnvRvMwZK c`v\_©¸‡jvi g‡a¨ G‡`i cwigvY GK kZvs‡kiI Kg| G¸‡jv cÖ¯ÍZ n‡qwQj AviI A‡bK c‡i| bÿ‡Îi Af¨šÍ‡i| †mUv Kxfv‡e n‡qwQj Zv Avgiv PZz\_© Aa¨v‡q †`Le|

me wgwj‡q gnvwe‡k^i cÖmviY, gnvRvMwZK cUf~wg wewKiY Ges ivmvqwbK †gŠ‡ji Av‡cwÿK cÖvPzh©- GB welq¸‡jv weM e¨vs Z‡Ë¡i mc‡ÿ †Rviv‡jv cÖgvY| Z‡e A‡bK cÖ‡kœi Reve GLbI ARvbv| †hgb, gnvwek^ wVK GB nv‡iB †Kb cÖmvwiZ n‡”Q? gv‡b, weM e¨vs †Kb GZ weM (eo) wQj? cÖv\_wgK gnvwek^ †Kb GZUv mylg (me w`‡K GKB iKg) wQj? Gnvk~‡b¨i me w`‡K †KbBev cÖmviY nvi GZUv mv`„k¨c~Y© wQj? †Kve (COBE) †h GKUz e¨wZµg Nb‡Z¡i AÂj Lyu‡R †c‡q‡Q ZviB ev Drm Kx wQj? Qvqvc\_ I Qvqvc\_ ¸”Q ‰Zwi‡Z wKš‘ GUzKz e¨wZµ‡gi Lye `iKvi wQj|

GB eo avuav¸‡jv mgvav‡bi j‡ÿ¨ mv¤úªwZK mg‡q eo eo D‡`¨vM †bIqv n‡q‡Q| D”P-kw³i KYvc`v\_©we`¨vi mv‡\_ weM e¨vs ZË¡‡K GKxf~Z Kiv n‡”Q| GKUv welq Av‡MB e‡j ivwL| ˆeÁvwbK `„wó‡KvY †\_‡K GB ÔbZzb Km‡gvjwRÕ wKš‘ Av‡M Av‡jvwPZ welq¸‡jvi †P‡q GKUz Kg wbf©i‡hvM¨| we‡kl K‡i KwYKvi †h cwigvY kw³ cÖZ¨ÿfv‡e chs‡eÿY Kiv n‡q‡Q Zvi †P‡q A‡bK †ewk kw³‡Z msNwUZ cÖwµqv wb‡q Av‡jvPbv Kie Avgiv| Avi GB cÖwµqv¸‡jv msNwUZ n‡qwQj gnvwe‡k^i R‡b¥i c‡ii †m‡K‡Ûi AwZ ÿz`ª GK fMœvsvk mg‡qi g‡a¨| †mB mg‡qi Ae¯’v m¤¢eZ GZUvB Pig wQj †h eZ©gv‡b MvwYZK bgybv (model) Qvov Avgv‡`i nv‡Z wKQzB †bB| GB bgybvi wfwË wbQKB ZvwË¡K wKQz aviYv|

GB bZzb Km‡gvjwRi GKwU Abygvb n‡jv Bb‡d¬kb ev ùxwZ (inflation) bv‡gi GKwU cÖwµqv| GwUi g~j e³e¨ n‡jv, GK †m‡K‡‡Ûi cÖ\_g fMœvs‡ki †Kv‡bv GK mg‡qi g‡a¨ gnvwek^ nVvr K‡i eo n‡q wekvj AvKvi aviY K‡i| welqwU eyS‡Z n‡j 3.2 wPÎwU Avevi †`Lyb| †iLvwU me mgq wb‡Pi w`‡KB †eu‡K Av‡m| Zvi gv‡b, ¯’v‡bi mvBR eo n‡Z \_vK‡jI Zv nq µ‡gB ÿz`ªZi nv‡i| Ab¨ w`‡K, ùxwZi mgq cÖmviY N‡UwQj µgk `ªæZZi †e‡M| G Ae¯’vwU †`Lv‡bv n‡q‡Q 3.3 bs wP‡Î (mwVK Abycv‡Z bq)| cÖ\_‡g cÖmviY \_vgwQj, wKš‘ ùxwZ ïiæ n‡Z n‡Z GwU `ªyZ †e‡o hvq| wKQz mg‡qi R‡b¨ †iLvwU Dc‡ii w`‡K QzU‡Z \_v‡K| †k‡l †iLvwU Avevi ¯^vfvweK Ae¯’vq wd‡i Av‡m| wKš‘ Gi g‡a¨B ¯’v‡bi mvnR 3.2 wP‡Îi Ae¯’v‡bi Zzjbvq A‡bK A‡bK eo n‡q hvq (GLv‡b hv †`Lv‡bv n‡q‡Q Zvi †P‡q A‡bK †ewk)|

wPÎ 3.3

ùxwZi ¯^iƒc| GKwU we‡ùvi‡Yi gva¨‡g ïiæ nIqvi c‡i AwZ Aí mg‡qi g‡a¨ gnvwek^ nVvr K‡i wekvj eo n‡q hvq| Dj¤^ AÿwU‡K Lye †ewk m¼zwPZ K‡i †`Lv‡bv n‡q‡Q| ùxwZ `kvi c‡i cÖmvi‡Yi nvi µgk Kg‡Z \_v‡K| 3.2 wP‡Îi g‡ZvB|

wKš‘ gnvwe‡k^i AvPiY †Kb Ggb n‡jv? GLv‡b gv\_vq ivL‡Z n‡e †h †iLvi wb‡Pi w`‡K MwZUv †cQ‡b `vqx n‡jv gnvKlx©q AvKl©Y ej| GwU cÖmviY‡K \_vwg‡q w`‡Z Pvq| d‡j Dc‡ii w`‡K MwZ‡K GK ai‡bi A¨vw›UMÖ¨vwfwU ev wecixZ gnvKl© Z\_v weKl©Y e‡ji cÖfve a‡i †bIqv †h‡Z cv‡i| hvi d‡j gnvwe†k^i mvBR µgk eo n‡”Q| wecixZ gnvK‡l©i aviYv‡K Lye A™¢zZ g‡b n‡Z cv‡i| wKš‘ mv¤úªwZK wKQz Abygvbwbf©i Z‡Ë¡i g‡Z G‡Kev‡i cÖv\_wgK gnvwe‡k^i ZvcgvÎv I Nb‡Z¡i Pig Ae¯’vq Ggb wKQz N‡U \_vK‡ZI cv‡i|

†mUv Kxfv‡e Zv ejvi Av‡M Avwg ej‡Z PvB Kxfv‡e ùxwZ ZË¡ Ic‡i DwjøwLZ wKQz gnvRvMwZK avuavi mgvavb Ki‡Z cv‡i| cÖ\_gZ, µgk `ªæZ nv‡ii cÖmviY †\_‡K weM e¨vs †Kb GZ eo wQj Zvi GKwU e¨vL¨v cvIqv hvq| A¨vw›UMÖAwfwU cÖfvewU †ek Aw¯’wZkxj I ZvrÿwYZ cÖwµqv| Zvi gv‡b, gnvwe‡k^i mvBR eon q m~PKxq nv‡i (exponentially)| MvwYwZKfv‡e ej‡j G K\_vi gv‡b `vuovq, GKwU wbw`©ó cwigvY mg‡q GKwU wbw`©ó ciwgvY ¯’v‡bi AvKvi wØ¸Y nq| aiv hvK, G mgqwUi bvg GKwU wUK| Zvn‡j `ywU wUK c‡i mvBR n‡e Pvi¸Y| wZb wU‡Ki c‡i AvU¸Y| `k wU‡Ki c‡i ¯’vbwU cÖmvwiZ n‡e 10 nvRvi ¸‡YiI †ewk| wnmve K‡i †`Lv †M‡Q, ùxwZ hyM cieZx© cÖmviY nvi eZ©gvb mg‡q ch©‡eÿ‡Y cÖvß cÖmviY nv‡ii mv‡\_ wg‡j †M‡Q| (GUv Øviv Avm‡j Kx †evSv‡Z Pvw”Q Zv Avwg lô Aa¨v‡q mwe¯Ív‡i eje)

ùxwZi Kvi‡Y mvBR †e‡o hvIqv †\_‡K gnvwe‡k^i mylg nevi †cQ‡bi KviYUvI mn‡RB e¨vL¨v Kiv hvq| ¯’v‡bi cÖmvi‡Yi Kvi‡Y cÖv\_wgK †h‡Kv‡bv welgZv DavI n‡q hv‡e| †ejyb‡K dzwj‡q eo Ki‡j †hfv‡e Gi fvuR¸‡jv DavI n‡q hvq †mfv‡eB| GKBfv‡e, cÖv\_wgK chv©‡q wfbœ wfbœ w`‡K cÖmvi‡Yi †h wfbœZv wQj ZvI ùxwZi cÖfv‡e wKQz mgq c‡i wgwj‡q hvq| KviY, ùxwZ me w`‡K mgvb †Z‡R KvR K‡i| Zvn‡j †Kve †h mvgvb¨ welgZv †cj Zvi e¨vL¨v Kx? Gi KviY m¤¢eZ ùxwZ GKB mg‡q mKj RvqMvq \_v‡gwb (Gi KviYI GKUz c‡i ejwQ)| d‡j wKQz AÂj Ab¨ AÂ‡ji †P‡q GKUz †ewk dz‡j-‡du‡c wM‡qwQj| d‡j Nb‡Z¡I n‡q wM‡qwQj wKQz ZviZg¨|

Gevi wKQz msL¨v wb‡q K\_v ewj| ùxwZ Z‡Ë¡i me‡P‡q mij iƒcwU‡Z ùxwZi (A¨vw›UM¨vwfwU) kw³ Lye †ewk kw³kvjx| hv gnvwek^‡K GK †m‡K‡Ûi cÖvq 10 jÿ †KvwU †KvwU †KvwU †KvwU fv‡Mi GK fvM mg‡qi g‡a¨ wØ¸Y eo K‡i †d‡j| AwZ ÿz`ªvwZÿz`ª GB mgqwU‡KB Avwg GKUz Av‡M GK wUK e‡jwQjvg| gvÎ 100 wU wU‡Ki c‡iB GKwU cigvYyi wbDwK¬qv‡mi mvB‡Ri ¯’vb dz‡j-‡du‡c wM‡q GK jvL Av‡jvKel© PIov AÂj n‡q hvq| Av‡M e‡j Avmv gnvRvMwZe in‡m¨i e¨vL¨vq GUv cy‡ivcywi h‡\_ó|

AwZcvigvYweK KYvc`v\_©we`¨vi wewfbœ Z‡Ë¡i mvnv‡h¨ ùxwZi D‡`ªKKvix A‡bK¸‡jv m¤¢ve¨ cÖwµqv Avwe®‹„Z n‡q‡Q| GB me¸‡jv cÖwµqvB †Kvqv›Uvg f¨vKzqvg bv‡g GKwU aviYvi Ici wbf©ikxj| GUv eyS‡Z n‡j Av‡M †Kvqv›Uvg c`v\_©we`¨v m¤ú‡K© wKQz K\_v †R‡b Avm‡Z n‡e| †Kvqv›Uvg Z‡Ë¡i m~Pbv N‡UwQj Av‡jv, Zvc BZ¨vw` Zwo”Pz¤^Kxq wewKi‡Yi ag© m¤ú‡K© GKwU Avwe®‹v‡ii ga¨ w`‡q| GB wewKiY ¯’v‡bi †fZi w`‡q Zi½ AvKv‡i Pj‡jI GwU Avevi Ggbfv‡eI AvPiY Ki‡Z cv‡i hv‡Z g‡b nq GwU Avm‡j KYv w`‡q MwVZ| Av‡jvi wbM©gb I †kvlY N‡U kw³i ÿz`ª ÿz`ª c¨v‡KU ev ¸”Q (†Kvqv›Uv) AvKv‡i| GB ¸”Q¸‡jvi bvg †dvUb| Zi½ I KYvgq AvPi‡Yi GB mgv‡ek cvigvYweK I AwZcvigvYweK RM‡Zi me e¯‘i †ÿ‡ÎB †`Lv hvq| d‡j, B‡jKUªb, †cÖvUb, wbDUªb BZ¨vw` †h mË¡v¸‡jv‡K mvaiYfv‡e KYv g‡b Kvi nq, Zv‡`i mevB-B, GgbwK cy‡iv cigvYyI we‡kl we‡kl cwiw¯’wZ‡Z Zi‡½i g‡Zv AvPiY Ki‡Z cv‡i|

‡Kvqv›Uvg Z‡Ë¡i GKwU cÖavb Ask n‡jv I‡qbv©i nvB‡Rbev‡M©i AwbðqZv bxwZ| GwU Abymv‡i †Kvqv›Uvg e¯‘‡`i me¸‡jv ˆewk‡ó¨i R‡b¨ mymsÁvqwZ gvb \_vK‡e bv| †hgb GKwU B‡jKUª‡bi GKB mv‡\_ GKwU wbw`©ó Ae¯’vb I wbw`©ó fi‡eM \_vK‡Z cv‡i bv| GKwU wbw`©ó gyn~‡Z© Gi kw³i gvbI wbw`©ó \_vK‡Z cv‡i bv| GLv‡b KvR K‡i kw³i gv‡bi AwbðqZv| Avgv‡`i wPi‡Pbv eo RM‡Z †Zv kw³ me mgq msiwÿZ4 \_v‡K (Gi m„wó ev webvk †bB)| wKš‘ †Kvqv›Uvg RM‡Z bxwZwU‡K ¯’wMZ K‡i ivLv hvq| GK gyn~Z© †\_‡K Ab¨ gyn~‡Z© ¯^Zù~Z© I Abby‡gqfv‡e kw³i cwigvY e`‡j †h‡Z cv‡i| hZ Aí mgq we‡ePbv Kiv n‡e, GB ˆ`e †Kvqv›Uvg welgZvI ZZ †ewk n‡e| mwZ¨ ej‡Z, KYvwU k~b¨ †\_‡KB kw³ avi Ki‡Z cv‡i, hw` wK bv Avevi Lye `ªæZB †mB kw³ cwi‡kva K‡i †`Iqv nq| nvB‡Rbev‡M©i AwbðqZvi bxwZi m~² MvwYwZK fvl¨ g‡Z eo AvKv‡i avi Kiv kw³ `ªyZ wdwi‡q w`‡Z nq| Avi †QvU F‡Yi †gqv` nq †ewk|

kw³i GB AwbðqZv †\_‡K wKQz `viæY djvdj †ewi‡q Av‡m| GgbI m¤¢vebv Av‡Q nVvr K‡i k~b¨ †\_‡K †dvU‡bi g‡Zv GKwU KYv ˆZwi n‡q †Mj| wgwj‡q †Mj LvwbK c‡iB| GB KYv¸‡jvi Aw¯ÍË¡ wU‡K \_v‡K avi Kiv kw³i Ici wbf©i K‡i| Ges †mB Kvi‡Y GB Aw¯ÍË¡ wbf©i K‡i mg‡qi IciI| Avgiv G‡`i‡K †`wL bv KviY Giv nq LyeB ÿY¯’vqx| wKš‘ Avgiv hv‡K k~b¨ ¯’vb e‡j g‡b Kwi †mUv Avm‡j G ai‡bi ÿY¯’vqx KYvq cwic~Y©| ïay †dvUbB bq, Ggb KYvi g‡a¨ i‡q‡Q B‡jKUªb, †cÖvUb I Ab¨ mevB| Avgv‡`i cwiwPZ I ¯’vqx KYv¸‡jv †\_‡K Avjv`v Kivi R‡b¨ GB ÿY¯’vqx KYv‡`i‡K ejv nq fvPz©qvj KYv| ¯’vqx‡`i bvg †hLv‡b ev¯Íe KYv|

A¯’vwq‡Z¡i K\_v ev` w`‡j fvPz©qvj KYvi mv‡\_ ev¯Íe KYvi †Kv‡bv cv\_©K¨ †bB| Ges evB‡i †\_‡K kw³ mievin K‡i nvB‡RbevM© FY cwi‡kv‡ai e¨e¯’v Ki‡j fvPz©qvj KYv‡`i‡K ev¯Íe KYvqI iƒcvš‘wiZ Kiv m¤¢e| Ges mwZ¨ ej‡Z, G‡K ZLb GKB ai‡bi Ab¨ ev¯Íe KYv †\_‡K Avjv`v K‡i †PbvI m¤¢e bq| †hgb GKwU fvPz©qvj B‡jKUªb mvaviYZ gvÎ 10-21 †m‡KÛ mgq ¯’vqx nq| ¯^ívqyi Rxe‡b Rxe‡b GwU wKš‘ w¯’i e‡m \_v‡K bv| webvk nevi Av‡M Av‡M AwZµg K‡i †dj‡Z cv‡i 10-11 †mw›UwgUvi c\_ (†hLv‡b GKwU cigvYy 10-8 †mw›UwgUvi PIov)| GB mg‡qi g‡a¨B hw` fvPz©qvj B‡jKUªbwU †Kv\_vI †\_‡K kw³ MÖnY Ki‡Z cv‡i (‡hgb aiæb Zwo”Pz¤^Kxq †ÿÎ †\_‡K), Zvn‡j Avi G‡K wejyß n‡Z n‡e bv| GwU ZLb wejKzY ¯^vfvweK B‡jKUªb wn‡m‡e wb‡Ri Aw¯ÍZ¡ wUwK‡q ivL‡Z cv‡i|

Avgiv GB fvPz©qvj KYv‡`i‡K †`L‡Z bv †c‡jI Rvwb †h k~b¨ ¯’v‡b G‡`i Aw¯ÍZ¡ Av‡Q| KviY G‡`i kbv³‡hvM¨ jÿY Giv †i‡L hvq| †hgb fvPz©qvj †dvU‡bi GKwU cÖfve n‡jv, GwU cigvYyi kw³ ¯Í‡i5 kw³i mvgvb¨ cwieZ©b ˆZwi K‡i| GQvovI B‡jKUª‡bi †PŠ¤^K åvg‡KI mgvb cwigvY cwieZ©b NUvq| eYv©jxexÿY c×wZ‡Z B‡Zvg‡a¨B GB †QvU wKš‘ ¸iæZ¡c~Y© cwieZ©b¸‡jv wbLyuZfv‡e cwigvc Kiv n‡q‡Q|

wKš‘ Av‡iKwU welq Gwo‡q †Mj fzj n‡q hv‡e| KviY n‡jv AwZcvigvYweK KwYKviv wKš‘ gy³fv‡e PjvPj K‡i bv| GUv wbf©i K‡i A‡bK¸‡jv e‡ji Ici| †Kvb cÖKvi ej KvR Ki‡e †mUv wbf©i Ki‡e KYvi cÖK…wZi Ici| G e‡ji cÖfv‡e wKš‘ Ic‡i †`Iqv †Kvqv›Uvg f¨vKzqv‡gi mij wPÎwU GK`g cv‡ë hvq| GB ej KYv‡`i ¯^ ¯^ fvPz©qvj KYv‡`i g‡a¨I KvR K‡i| AZGe n‡Z cv‡i †h G‡Ki †ewk ai‡bi f¨vKzqvg Ae¯’vi Aw¯ÍZ¡ i‡q‡Q| GKvwaK m¤¢ve¨ †Kvqv›Uvg Ae¯’vi (†÷U) Aw¯ÍZ¡ †Kvqv›Uvg c`v\_©we`¨vi GKwU cwiwPZ w`K| Gi me‡P‡q cwiwPZ D`vniY n‡jv cigvYyi wewfbœ kw³ ¯Íi| cigvYyi wbDwK¬qvm‡K cÖ`wÿYiZ B‡jKUªb ïay wbw`©ó kw³i wKQz mymsÁvwqZ Ae¯’v‡ZB Aw¯ÍZ¡evb \_vK‡Z cv‡i| me‡P‡q wb‡Pi ¯Í‡ii bvg MÖvDÛ †÷U| GUv w¯’wZkxj Ae¯’v| D”PZi Ae¯’v¸‡jv D‡ËwRZ I Aw¯’wZkxj| †Kv‡bv B‡jKUªb D”PZi Ae¯’vq P‡j †M‡j GwU GK ev GKvwaK av‡c cybivq wb‡Pi ¯Í‡i Aew¯’Z MÖvDÛ †÷‡U P‡j Avm‡e| mymsÁvwqZ Aav©qy (half life) wewkó D‡ËwRZ Ae¯’v Gfv‡eB ÿq n‡Z \_v‡K|

f¨vKzqv‡gi †ÿ‡ÎI GKB bxwZ KvR K‡i| G‡Z GK ev GKvwaK D‡ËwRK †÷U \_vK‡Z cv‡i| GB †÷U¸‡jvi kw³i cwigvY wfbœ wfbœ| Aek¨ Zv‡`i‡K †`L‡Z GKB iKg †`Lv‡e| Avi hvB †nvK, meB †Zv Lvwj! me©wb¤œ kw³ ¯Íi ev MÖvDÛ †÷U‡K A‡bK mgq ejv nq cÖK…Z f¨vKzqvg| KviY, GUvB n‡jv w¯’wZkxj Ae¯’v| Ges GwUB Avgv‡`i eZ©gv‡bi †`Lv gnvwe‡k^i k~b¨ ¯’vb wn‡m‡e KvR K‡i| D‡ËwRZ f¨vKzqvg‡K ejv nq bKj f¨vKzqvg|

Z‡e e‡j ivLv fvj, bKj f¨vKzqvg GLb ch©šÍ wbQKB ZvwË¡K GKwU aviYv| Ges G‡`i ˆewkó¨I g~jZ wbf©i K‡i †Kvb ZË¡ w`‡q G‡`i‡K wePvi Kiv n‡”Q Zvi Ici| Z‡e mv¤úªwZK ZË¡¸‡jv‡Z G‡`i aviYv mnRvZfv‡eB P‡j Av‡m| G ZË¡¸‡jvi jÿ¨ n‡jv cÖK…wZi PviwU †gŠwjK ej‡K GKxf~Z Kiv| ej¸‡jv n‡jv gnvKl©, Avgv‡`i cwiwPZ Zwo”Pz¤^Kxq ej Ges ¯^í-cvjøvi `ywU wbDK¬xq ej, hviv `ye©j I mej ej wn‡m‡e cwiPwZ| GK mgq Aek¨ ZvwjKvUv AviI j¤^v wQj| Zwor I †PŠ¤^K ej‡K GK mgq Avjv`v fvev nZ| GKxf~Z Kivi KvR ïiæ nq Ewbk kZ‡Ki ïiæi w`‡K| mv¤úªwZK `kK¸‡jv‡Z G Kv‡R fv‡jv AMÖMwZ n‡q‡Q| GLb Rvbv n‡q †M‡Q †h Zwo”Pz¤^Kxq Ges `ye©j wbDK¬xq ej GKB my‡Zvq Mvu\_v| G‡K GK K\_vq ejv n‡”Q Zwor`ye©j ej (electroweak force)| eû c`v\_©we` wek^vm K‡ib, mej ejI Zwor`ye©j e‡ji mv‡\_ wg‡j hv‡e| Ggb wgj ˆZwi‡Z mÿg ZË¡¸‡jv‡K ejv nq MÖ¨vÛ BDwbdv‡qW w\_Iwi| GUv nIqv Lye m¤¢e †h Mfxi †Kv‡bv chv©‡q me¸‡jv †dvm© ev ej GKwUgvÎ mycvi-‡dv‡m© G‡m wgwjZ n‡e|

ùxwZ cÖwµqvi me‡P‡q fv‡jv e¨L¨v¸‡jv cvIqv hvq wewfbœ Mª¨vÛ BDwbdv‡qW w\_Iwi †\_‡KB| G ZË¡¸‡jvi GKwU g~j ˆewkó¨ n‡jv bKj f¨vKzqvg †÷‡Ui kw³ A‡bK †ewk| gvÎ GK NbwgUvi ¯’v‡bi kw³ 1087 Ryj6| Ggb Ae¯’vq cigvYyi g‡Zv †QvÆ AvqZ‡bi RvqMvqI 1062 Ryj kw³ \_vK‡e| †hLv‡b GKwU D‡ËwRZ cigvYyi kw³ gvÎ 10-18 Ryj| d‡j cÖK…Z f¨vKzqvg‡K D‡ËwRZ A‡bK A‡bK †ewk kw³ cÖ‡qvRb| Ges eZ©gvb gnvwe‡k^ bKj f¨vKzqv‡gi ‡`Lv cvIqvi AvkvI †bB| Z‡e weM e¨vs Gi g‡Zv Pig Ae¯’vq welq¸‡jv m¤¢e|

bKj f¨vKzqvg †÷‡U †h wecyj cwigvY kw³ \_v‡K Zvi \_v‡K Zxeª gnvKlx©q cÖfveI| KviY, AvBb÷vBb Avgv‡`i †`wL‡q‡Qb, kw³iI fi Av‡Q| d‡j mvaviY e¯‘i g‡Zv GiI gnvKlx©q AvKl©Y \_vK‡e| †Kvqv›Uvg f¨vKzqv‡gi Zxeª kw³ Lye Zxeª AvKl©Yagx©| GK NbwgUvi bKj f¨vKzqv‡gi kw³ 1067 Ub f‡ii mgvb| ch©‡eÿY‡hvM¨ cy‡iv gnvwe‡k^i fiI AviI Kg (1050)| GB Zxeª gnvKl© ùxwZi c‡ÿ K\_v e‡j bv| ùxwZi R‡b¨ `iKvi †Kv‡bv iKg GKwU A¨vw›UMª¨vwfwU| wKš‘ bKj f¨vKzqv‡gi wekvj kw³i R‡b¨ `iKvi GKB iKg wekvj cwigvY bKj f¨vKzqvg Pvc (false-vacuum pressure)| GB PvcUvB wKš‘ Avmj welq| Avgiv mvaviYZ Pvc‡K gnvK‡l©i Drm g‡b Kwi bv| wKš‘ Avm‡j †mwU Drm wn‡m‡e KvR K‡i| evB‡ii w`‡K hvwš¿Y ej cÖ‡qvM Ki‡jI Pvc Avevi †fZ‡ii w`‡KI gnvKlx©q Uvb ˆZwi K‡i| Avgv‡`i m`v-cwiwPZ e¯‘‡`i †ÿ‡Î Zvi f‡ii Zzjbvq Pv‡ci gnvKlx©q cÖfve Lye bMY¨| †hgb, c„w\_ex‡Z Avcbvi IR‡bi GKk †KvwU fv‡Mi GK fv‡MiI K‡gi †cQ‡b `vqx n‡jv c„w\_exi Af¨šÍixY Pvc| wKš‘ ZeyI GUv wKš‘ ev¯Íe| Ges †Kv‡bv wm‡÷‡g Pvc AZ¨waK n‡j fiRwbZ gnvKlx©q cÖfv‡ei †P‡qI GwU †ewk K‡i Abyf~Z n‡e|

bKj f¨vKzqv‡gi †ÿ‡Î kw³7 †hgb wekvj, †Zgwb wekvj Zvi Pvc| wKš‘, ¸iæZ¡c~Y© welq n‡jv Pvc GLv‡b FYvZ¥K| d‡j bKj f¨vKzqvg av°v †`q bv, eis Uv‡b| FYvZ¥K Pvc ˆZwi K‡i FYvZ¥K gnvKlx©q Uvb| gv‡b A¨vw›UMÖ¨vwfwU| d‡j bKj f¨vKzqv‡gi gnvKl© wb‡q kw³i AvKl©Yagx© I Pv‡ci weKl©Yagx© cÖfv‡ei g‡a¨ Zxeª cÖwZ‡hvwMZv P‡j| wRZ nq Pv‡ciB| Ges weKl©‡Yi †bU cÖfve GZ †ewk †h GwU gyn~‡Z©i g‡a¨ gnvwek^‡K Dwo‡q w`‡Z cv‡i| ùxwZi Ggb Zxeª av°vi d‡jB gnvwek^ cÖwZ 10-34 †m‡K‡Ûi g‡Zv ÿz`ª mg‡q cÖPÐ MwZ‡Z wØ¸Y eo nZ|

bKj f¨vKzqvg mnRvZfv‡e Aw¯’wZkxj| mKj D‡ËwRZ †Kvqv›Uvg †÷‡Ui g‡Zv GwUI ÿq n‡q MÖvDÛ †÷‡U, gv‡b cÖK…Z f¨vKzqv‡g Avm‡Z Pvq| m¤¢eZ K‡qK WRb ÔwUKÕ cvi n‡j GwU GUv Ki‡Z mÿg nq| †Kvqv›Uvg cÖwµqv nevi Kvi‡Y Gi g‡a¨ Awbevh©fv‡e KvR K‡i AwbðqZv I ˆ`e cwieZ©b, †hUv GKUz nvB‡Rbev‡M©i AwbðqZv bxwZi K\_v ej‡Z wM‡q Av‡jvPbv Kiv n‡q‡Q| Zvi gv‡b, ¯’v‡bi me w`‡K ÿq GKB nv‡i NU‡e bv| wewfbœ w`‡K Zv n‡e Avjv`vfv‡e| wKQz wKQz ZvwË¡‡Ki g‡Z †Kve (COBE) †h e¨wZµg Lyu‡R †c‡q‡Q Zvi KviY GB wfbœZv Qvov Avi wKQzB bq|

bKj f¨vKzqvg ÿq n‡q †M‡j gnvwek^ Zvi ¯^vfvweK cÖmviY ïiæ Kij| gv‡b ax‡i ax‡i Kgj cÖmvi‡Yi nvi| bKj f¨vKzqA‡g Ave× kw³ Aegy³ n‡jv| GUv †ei n‡jv Zvc AvKv‡i| ùxwZi Kvi‡Y †h wekvj cÖmviY NUj, Zv‡Z gnvwe‡k^i ZvcgvÎv cig k~‡b¨i Lye KvQvKvwQ n‡jv| nVvr ùxwZ †\_‡g hvIqvq ZvcgvÎv Avevi †e‡o 1028 wWwMÖ n‡q †Mj| GB wecyj Zvc AvRI i‡q †M‡Q| Aek¨ †mUvi ZxeªZv A‡bK K‡g †M‡Q| GiB bvg gnvRvMwZK cUf~wg Zvc wewKiY| f¨vKzqvg GbvwR© Aegy³ nevi cvkvcvwk Av‡iKwU NUbvI NUj| †Kvqv›Uvg f¨vKzqv‡gi A‡bK¸‡jv KYv G †\_‡K wKQz kw³ MÖnY K‡i ev¯Íe KYvq DbœxZ n‡jv| AviI wKQz cÖwµqv I cwieZ©b †k‡l GB Avw`g KYv¸‡jvi aŸsmve‡kl †\_‡K 1050 Ub c`v\_© ˆZwi n‡jv| GB c`v\_© †\_‡KB Avcwb, Avwg, Qvqvc\_ I gnvwe‡k^i evwKUv m„wó n‡jv|

eo eo A‡bK Km‡gvjwR÷B g‡b K‡ib ùxwZi aviYvB gnvwe‡k¦i BwZnv‡mi mwZ¨Kvi wPÎ cÖ`vb K‡i| hw` GwU Avm‡jB mwVK nq, Zvn‡j gnvwe‡k^i †gŠwjK KvVv‡gv Ges †fŠZ Dcv`vbmg~n †Kgb n‡e Zv wVK n‡q wM‡qwQj R‡b¥i gvÎ 10-32 †m‡KÛ c‡iB| ùxwZi c‡i gnvwe‡k^i AwZcvigvYweK ¯Í‡i N‡UwQj AviI bvbvb cwieZ©b| cÖv\_wgK c`v\_© †\_‡K ˆZwi n‡jv KYv I cigvYy| Avgv‡`i mg‡qi gnvRvMwZK e¯‘¸‡jv G‡`i w`‡qB Mov| Z‡e c`v‡\_©i AwaKvsk evowZ cÖwµqvKiY m¤úbœ n‡qwQj gvÎ cÖvq wZb wgwb‡Ui g‡a¨|

cÖ\_g wZb wgwb‡Ui mv‡\_ †kl wZb wgwb‡Ui m¤úK© Kx? GKwU ey‡j‡Ui fvM¨ †hgb Gi jÿ¨gvÎvi Ici Lye †ewk wbf©i K‡i, †Zgwb gnvwe‡k^i cwiYwZI Gi cªv\_wgK Ae¯’vi Ici `viæYfv‡e wbf©ikxj| Avgiv mvg‡b †`Le, cÖv\_wgK m~Pbv †\_‡K gnvwe‡k^i cÖmviY I weM e¨vs †\_‡K D™¢~Z c`v‡\_©i cÖK…wZ gnvwe‡k^i P~ovšÍ fwel¨Z‡K Kxfv‡e cÖfvweZ K‡i| gnvwe‡k^i ïiæ I †kl GKB my‡Zvq †Mu‡\_ Av‡Q k³fv‡e|

Abyev`‡Ki †bvU:

1. †cÖvUb I wbDUªb Aek¨ wVK †gŠwjK KwYKv bq, MwVZ †KvqvK© w`‡q|
2. nvB‡ªWv‡R‡bi me‡P‡q mij i~cwU‡Z GKwUgvÎ †cÖvUb \_v‡K| †Kv‡bv wbDUªb \_v‡K bv|
3. 2 wU †cÖvUb m¤^wjZ nvB‡WªvR‡bi Av‡iKwU iƒc|
4. kw³i msiÿYkxjZv bxwZ Abymv‡i, gnvwe‡k^i †gvU kw³i cwigvY wbw`©ó| kw³i m„wó ev webvk †bB| G‡K †Kej GK iƒc †\_‡K Ab¨ GK ev GKvwaK iƒ‡c iƒcvšÍwiZ Kiv †h‡Z cv‡i|
5. gv‡b cigvYyi Kÿc‡\_| mvaviY `„wó‡KvY †\_‡K fve‡j cigvYyi ‡K›`ªxq Ae¯’v‡bi wbDwK¬qv‡mi Pviw`‡Ki wewfbœ Kÿc‡\_ B‡jKUªb¸‡jv ew›UZ \_v‡K|
6. GKwU Av‡cj‡K GK wgUvi D”PZvq Zzj‡j †gvUvgywU GK Ryj cwigvY kw³ LiP nq| Gevi wPšÍv Kiæb Zvn‡j 1087 Ryj KZ wekvj|
7. G‡b ivL‡Z n‡e, kw³ wKš‘ f‡iiB Av‡iK iƒc| ZvB kw³iI gnvKlx©q Uvb \_vK‡e|