FIG. 1

```
SEQ ID NO:1 MILDTDYITENGKPVIRVFKKENGEFKIEYDRTFEPYFYALLKDDSAIEDVKKVTAKRHG 60
SEQ ID NO:2 MILDTDYITKDGKPIIRIFKKENGEFKIELDPHFQPYIYALLKDDSAIEEIKAIKGERHG 60
SEQ ID NO:7 MILDADYITEDGKPVIRVFKKEKGEFKINYDRDFEPYIYALLKDDSAIEDIKKITAERHG 60
SEQ ID NO:5 MILDTDYITEDGKPVIRIFKKENGEFKIEYDRTFEPYFYALLKDDSAIEEVKKITAERHG 60
SEQ ID NO:4 MILDVDYITEEGKPVIRLFKKENGKFKIEHDRTFRPYIYALLRDDSKIEEVKKITGERHG 60
SEQ ID NO:3 MILDADYITEDGKPIIRIFKKENGEFKVEYDRNFRPYIYALLKDDSQIDEVRKITAERHG 60
SEQ ID NO:6 MIIDADYITEDGKPIIRIFKKEKGEFKVEYDRTFRPYIYALLKDDSAIDEVKKITAERHG 60
                **:*.****::***:**:****:*:**:: *  *.**:****:*** *:::: :..:***

SEQ ID NO:1 TVVKVKRAEKVQKKFLGRPIEVWKLYFNHPQDVPAIRDRIRAHPAVVDIYEYDIPFAKRY 120
SEQ ID NO:2 KTVRVLDAVKVRKKFLGREVEVWKLIFEHPQDVPAMRGKIREHPAVVDIYEYDIPFAKRY 120
SEQ ID NO:7 TTVRVTRAERVKKKFLGRPVEVWKLYFTHPQDVPAIRDKIREHPAVVDIYEYDIPFAKRY 120
SEQ ID NO:5 TVVTVKRVEKVQKKFLGRPVEVWKLYFTHPQDVPAIRDKIREHPAVIDIYEYDIPFAKRY 120
SEQ ID NO:4 KIVRIVDVEKVEKKFLGKPITVWKLYLEHPQDVPTIREKVREHPAVVDIFEYDIPFAKRY 120
SEQ ID NO:3 KIVRIIDAEKVRKKFLGRPIEVWRLYFEHPQDVPAIRDKIREHSAVIDIFEYDIPFAKRY 120
SEQ ID NO:6 KIVRITEVEKVQKKFLGRPIEVWKLYLEHPQDVPAIREKIREHPAVVDIFEYDIPFAKRY 120
              . * :  . :*.*****: : **:* : ******::* ::* * **:**:**********

SEQ ID NO:1 LIDKGLIPMEGDEELTMLAFDIETLYHEGEEFGTGPILMISYADGSEARVITWKKIDLPY 180
SEQ ID NO:2 LIDKGLIPMEGDEELKLLAFAIATFYHEGDEFGKGEIIMISYADEEEARVITWKNIDLPY 180
SEQ ID NO:7 LIDKGLIPMEGNEELRMLAFDIETLYHEGEEFGEGPILMISYADEEGARVITWKNIDLPY 180
SEQ ID NO:5 LIDKGLVPMEGDEELKMLAFAIATLYHEGEEFAEGPILMISYADEEGARVITWKNVDLPY 180
SEQ ID NO:4 LIDKGLIPMEGEEELKILAFDIETLYHEGEEFGKGPIIMISYADENEAKVITWKNIDLPY 180
SEQ ID NO:3 LIDKGLIPMEGDEELKLLAFAIATLYHEGEEFAKGPIIMISYADEEEAKVITWKKIDLPY 180
SEQ ID NO:6 LIDKGLTPMEGNEELTFLAVAIATLYHEGEEFGKGPIIMISYADEEGAKVITWKSIDLPY 180
            ****** *****:*** :**. * *:*****:**. * *:****** . *:*****.:****
```

FIG. 1 cont'd

```
SEQ ID NO:1 VDVVSTEKEMIKRFLRVVVREKDPDVLITYNGDNFDFAYLKKRCEELGIKFTLGRDG--SE 238
SEQ ID NO:2 VDVVSNEREMIKRFVQVVKEKDPDVIITYNGDNFDLPYLIKRAEKLGVRLVLGRDKEHPE 240
SEQ ID NO:7 VESVSTEKEMIKRFLKVIQEKDPDVLITYNGDNFDFAYLKKRSETLGVKFILGRDG--SE 238
SEQ ID NO:5 VDVVSTEREMIKRFLRVVKEKDPDVLITYNGDNFDFAYLKKRCEKLGINFALGRDG--SE 238
SEQ ID NO:4 VEVVSSEREMIKRFLRIIREKDPDIIVTYNGDSFDFPYLAKRAEKLGIKLTIGRDG--SE 238
SEQ ID NO:3 VEVVSSEREMIKRFLKVIREKDPDVIITYNGDSFDLPYLVKRAEKLGIKLPLGRDG--SE 238
SEQ ID NO:6 VEVVSSEREMIKRLVKVIREKDPDVIITYNGDNFDFPYLLKRAEKLGIKLPLGRDN--SE 238
                 *: **.*:*****:::::::*****.::*****.**:  ** **.* **:.: :*** *

SEQ ID NO:1 PKIQRMGDRFAVEVKGRIHFDLYPVIRRTINLPTYTLEAVYEAVFGKPKEKVYAEEIAQA 298
SEQ ID NO:2 PKIQRMGDSFAVEIKGRIHFDLFPVVRRTINLPTYTLEAVYEAVLGKTKSKLGAEEIAAI 300
SEQ ID NO:7 PKIQRMGDRFAVEVKGRIHFDLYPVIRRTINLPTYTLETVYEAIFGQPKEKVYAEEIAQA 298
SEQ ID NO:5 PKIQRMGDRFAVEVKGRIHFDLYPVIRRTINLPTYTLEAVYEAVFGQPKEKVYAEEITTA 298
SEQ ID NO:4 PKMQRIGDMTAVEVKGRIHFDLYHVITRTINLPTYTLEAVYEAIFGKPKEKVYADEIAKA 298
SEQ ID NO:3 PKMQRLGDMTAVEIKGRIHFDLYHVIRRTINLPTYTLEAVYEAIFGKPKEKVYAHEIAEA 298
SEQ ID NO:6 PKMQRMGDSLAVEIKGRIHFDLFPVIRRTINLPTYTLEAVYEAIFGKSKEKVYAHEIAEA 298
                 **:**:**  ***:**********: *: **********:****:::*: *.*: *.**:

SEQ ID NO:1 WESGEGLERVARYSMEDAKVTYELGREFFPMEAQLSRLIGQSLWDVSRSSTGNLVEWFLL 358
SEQ ID NO:2 WETEESMKKLAQYSMEDARATYELGKEFFPMEAELAKLIGQSVWDVSRSSTGNLVEWYLL 360
SEQ ID NO:7 WESGEGLERVARYSMEDAKATYELGKEFFPMEAQLSRLVGQSLWDVSRSSTGNLVEWFLL 358
SEQ ID NO:5 WETGENLERVARYSMEDAKVTYELGKEFLPMEAQLSRLIGQSLWDVSRSSTGNLVEWFLL 358
SEQ ID NO:4 WESGENLERVAKYSMEDAKATYELGKEFLPMEIQLSRLVGQPLWDVSRSSTGNLVEWFLL 358
SEQ ID NO:3 WETGKGLERVAKYSMEDAKVTYELGREFFPMEAQLSRLVGQPLWDVSRSSTGNLVEWYLL 358
SEQ ID NO:6 WETGKGLERVAKYSMEDAKVTFELGKEFFPMEAQLARLVGQPVWDVSRSSTGNLVEWFLL 358
                 **: :.:::::*:********:.*:****:**:*** :*::*:** :********************:**
```

FIG. 1 cont'd

```
SEQ ID NO:1 RKAYKRNELAPNKPDERELARR-RGGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHN 417
SEQ ID NO:2 RVAYARNELAPNKPDEEYKRRLRTTYLGGYVKEPEKGLWENIIYLDFRSLYPSIIVTHN 420
SEQ ID NO:7 RKAYERNELAPNKPDERELARR-AESYAGGYVKEPEKGLWENIVYLDYKSLYPSIIITHN 417
SEQ ID NO:5 RKAYERNELAPNKPDEKELARR-RQSYEGGYVKEPERGLWENIVYLDFRSLYPSIIITHN 417
SEQ ID NO:4 RKAYERNEVAPNKPSEEEYQRRLRESYTGGFVKEPEKGLWENIVYLDFRALYPSIIITHN 418
SEQ ID NO:3 RKAYERNELAPNKPDEREYERRLRESYAGGYVKEPEKGLWEGLVSLDFRSLYPSIIITHN 418
SEQ ID NO:6 RKAYERNELAPNKPDEREYERRLRESYEGGYVKEPEKGLWEGIVSLDFRSLYPSIIITHN 418
                * ** ***:*****.*.*  ** * **:*****:***:.:: **:::******:***

SEQ ID NO:1 VSPDTLNREGCKEYDVAPEVGHKFCKDFPGFIPSLLGDLLEERQKIKRKMKATVDPLEKK 477
SEQ ID NO:2 VSPDTLEKEGCKNYDVAPIVGYRFCKDFPGFIPSILGDLIAMRQDIKKKMKSTIDPIEKK 480
SEQ ID NO:7 VSPDTLNREGCREYDVAPQVGHRFCKDFPGFIPSLLGDLLEERQKVKKKMKATVDPIERK 477
SEQ ID NO:5 VSPDTLNREGCKEYDVAPQVGHRFCKDFPGFIPSLLGDLLEERQKIKKKMKATIDPIERK 477
SEQ ID NO:4 VSPDTLNLEGCKNYDIAPQVGHKFCKDIPGFIPSLLGHLLEERQKIKTKMKETQDPIEKI 478
SEQ ID NO:3 VSPDTLNREGCREYDVAPEVGHKFCKDFPGFIPSLLKRLLDERQEIKRKMKASKDPIEKK 478
SEQ ID NO:6 VSPDTLNRENCKEYDVAPQVGHRFCKDFPGFIPSLLGNLLEERQKIKKRMKESKDPVEKK 478
                ******: *.*::**:** **::****:*******:*  *:  **.:* :** : **:*:

SEQ ID NO:1 LLDYRQRAIKILANSFYGYYGYAKARWYCKECAESVTAWGREYIEMVIRELEEKFGFKVL 537
SEQ ID NO:2 MLDYRQRAIKLLANSYYGYMGYPKARWYSKECAESVTAWGRHYIEMTIREIEEKFGFKVL 540
SEQ ID NO:7 LLDYRQRAIKILANSYYGYYGYANARWYCRECAESVTAWGRQYIETTMREIEEKFGFKVL 537
SEQ ID NO:5 LLDYRQRAIKILANSYYGYYGYARARWYCKECAESVTAWGREYITMTIKEIEEKYGFKVI 537
SEQ ID NO:4 LLDYRQKAIKLLANSFYGYYGYAKARWYCKECAESVTAWGRKYIELVWKELEEKFGFKVL 538
SEQ ID NO:3 MLDYRQRAIKILANSYYGYYGYAKARWYCKECAESVTAWGREYIEFVRKELEEKFGFKVL 538
SEQ ID NO:6 LLDYRQRAIKILANSYYGYYGYAKARWYCKECAESVTAWGRQYIDLVRRELES-RGFKVL 537
                :*****:***:****:*** ** .****.:*********.**  . :*:*.  ****:
```

FIG. 1 cont'd

```
SEQ ID NO:1 YADTDGLHATIPGADAETVKKKAKEFLKYINPKLPGLLELEYEGFYVRGFFVTKKKYAVI 597
SEQ ID NO:2 YADTDGFYATIPGEKPELIKKKAKEFLNYINSKLPGLLELEYEGFYLRGFFVTKKRYAVI 600
SEQ ID NO:7 YADTDGFFATIPGADAETVKKKTKEFLNYINPRLPGLLELEYEGFYRRGFFVTKKKYAVI 597
SEQ ID NO:5 YSDTDGFFATIPGADAETVKKKAMEFLKYINAKLPGALELEYEGFYKRGFFVTKKKYAVI 597
SEQ ID NO:4 YIDTDGLYATIPGGESEEIKKKALEFVKYINSKLPGLLELEYEGFYKRGFFVTKKRYAVI 598
SEQ ID NO:3 YIDTDGLYATIPGAKPEEIKKKALEFVDYINAKLPGLLELEYEGFYVRGFFVTKKKYALI 598
SEQ ID NO:6 YIDTDGLYATIPGAKHEEIKEKALKFVEYINSKLPGLLELEYEGFYARGFFVTKKKYALI 597
                * ****:.*****  .  * :*:*: :*:.*** :*** ********** ********:**:*

SEQ ID NO:1 DEEGKITTRGLEIVRRDWSEIAKETQARVLEAILKHGDVEEAVRIVKEVTEKLSKYEVPP 657
SEQ ID NO:2 DEEGRITTRGLEVVRRDWSEIAKETQAKVLEAILKEGSVEKAVEVVRDVVEKIAKYRVPL 660
SEQ ID NO:7 DEEDKITTRGLEIVRRDWSEIAKETQARVLEAILKHGDVEEAVRIVKEVTEKLSRYEVPP 657
SEQ ID NO:5 DEEGKITTRGLEIVRRDWSEIAKETQARVLEALLKDGDVEKAVRIVKEVTEKLSKYEVPP 657
SEQ ID NO:4 DEEGKVITRGLEIVRRDWSEIAKETQARVLETILKHGDVEEAVRIVKEVIQKLANYEIPP 658
SEQ ID NO:3 DEEGKIITRGLEIVRRDWSEIAKETQAKVLEAILKHGNVEEAVKIVKEVTEKLSKYEIPP 658
SEQ ID NO:6 DEEGKIVTRGLEIVRRDWSEIAKETQAKVLEAILKHGNVDEAVKIVKEVTEKLSKYEIPP 657
            ***.::  *****:**********:***::**.*.*::**.:*::*  :*::.*.:*

SEQ ID NO:1 EKLVIHEQITRDLRDYKATGPHVAVAKRLAARGVKIRPGTVISYIVLKGSGRIGDRAIPA 717
SEQ ID NO:2 EKLVIHEQITRDLKDYKAIGPHVAIAKRLAARGIKVKPGTIISYIVLKGSGKISDRVILL 720
SEQ ID NO:7 EKLVIYEQITRNLRDYRATGPHVAVAKRLAARGIKIRPGTVISYIVLKGPGRVGDRAIPF 717
SEQ ID NO:5 EKLVIHEQITRDLKDYKATGPHVAVAKRLAARGVKIRPGTVISYIVLKGSGRIGDRAIPF 717
SEQ ID NO:4 EKLAIYEQITRPLHEYKAIGPHVAVAKKLAAKGVKIKPGMVIGYIVLRGDGPISNRAILA 718
SEQ ID NO:3 EKLVIYEQITRPLHEYKAIGPHVAVAKRLAARGVKVRPGMVIGYIVLRGDGPISKRAILA 718
SEQ ID NO:6 EKLVIYEQITRPLSEYKAIGPHVAVAKRLAAKGVKVKPGMVIGYIVLRGDGPISKRAIAI 717
            ***.*:*:***** * :*:* *****:**:***:*:*::** :*.*****:* * :..*.*
```

FIG. 1 cont'd

```
SEQ ID NO:1 DEFDPTKHRYDAEYYIENQVLPAVERILKAFGYRKEDLRYQKTKQVGLGAWLKVKGKK- 775
SEQ ID NO:2 TEYDPRKHKYDPDYYIENQVLPAVLRILEAFGYRKEDLRYQSSKQTGLDAWLKR----- 774
SEQ ID NO:7 DEFDPAKHRYDAEYYIENQVLPAVERILRAFGYRKEDLRYQKTKQAGLGAWLKPKTGS- 775
SEQ ID NO:5 DEFDPTKHKYDAEYYIENQVLPAVERILRAFGYRKEDLRYQKTRQVGLSAWLKPKGT-- 774
SEQ ID NO:4 EEYDPKKHKYDAEYYIENQVLPAVLRILEGFGYRKEDLRYQKTRQVGLTSWLNIKKS-- 775
SEQ ID NO:3 EEFDLRKHKYDAEYYIENQVLPAVLRILEAFGYRKEDLRWQKTKQTGLTAWLNIKKKGS 777
SEQ ID NO:6 EEFDPKKHKYDAEYYIENQVLPAVERILRAFGYRKEDLKYQKTKQVGLGAWLKFGS--- 773
                 *:*  **:** :********** ***..********::*.::*.** :**:
```

FIG. 2

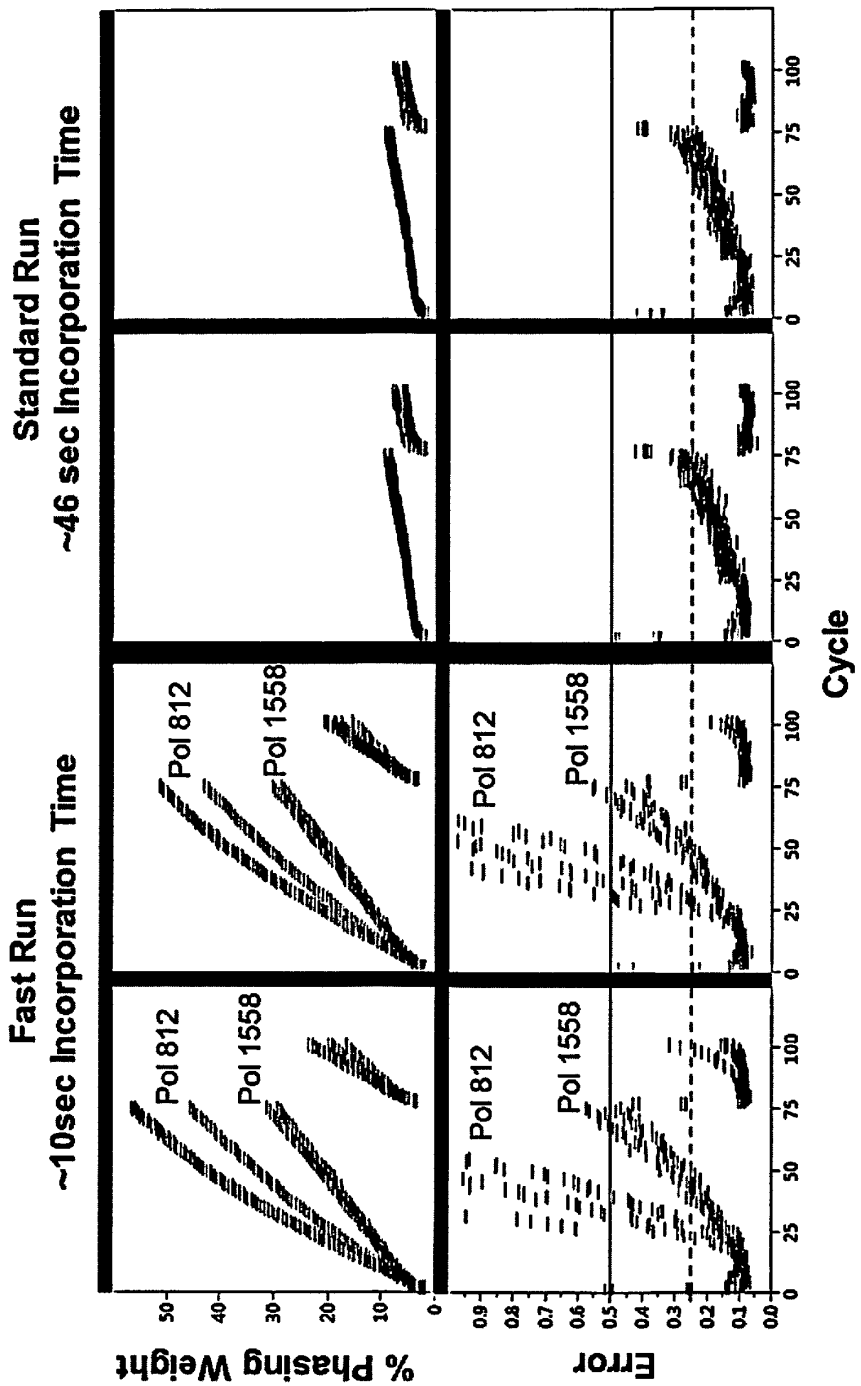

Fast Run
~10sec Incorporation Time
Standard Run
~46 sec Incorporation Time
Pol 812
Pol 1558
% Phasing Weight
Error
Cycle

FIG. 3A

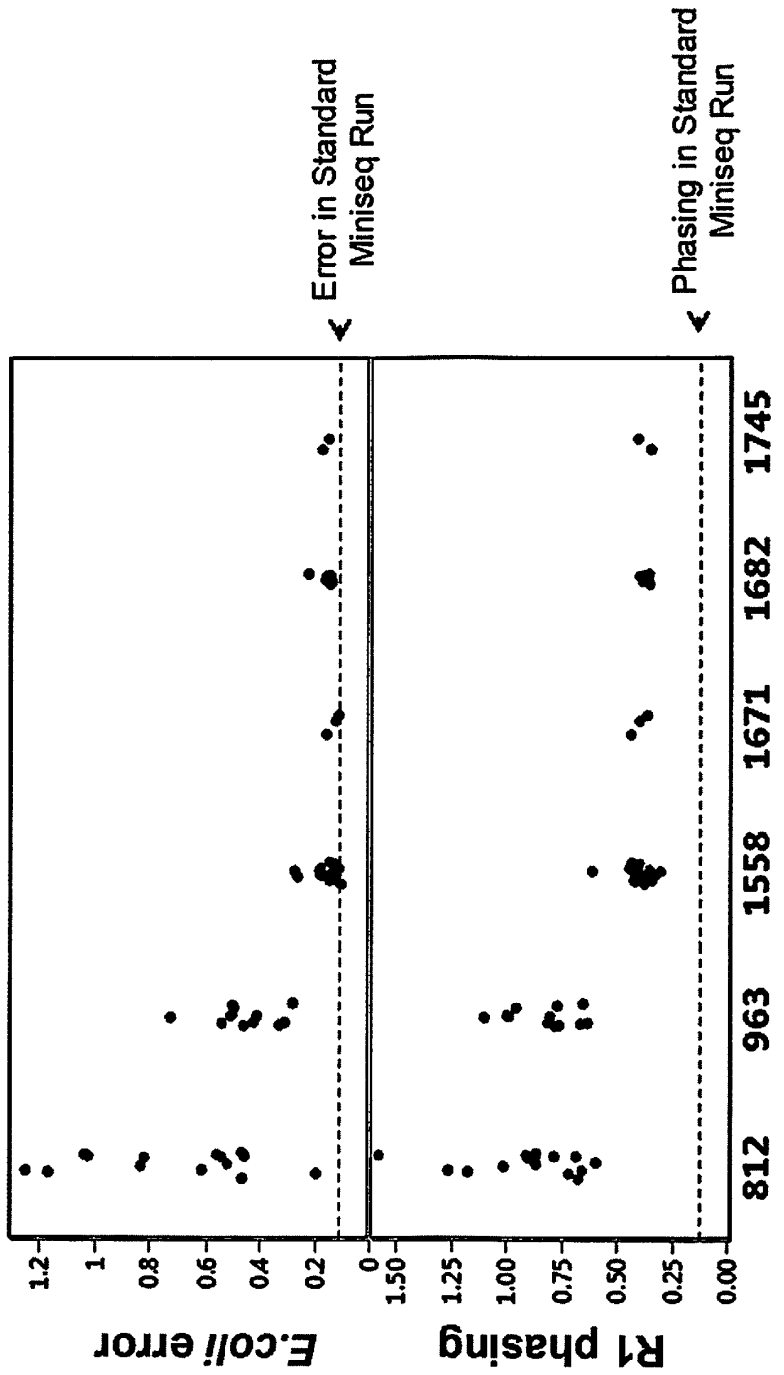

Error in Standard Miniseq Run
Phasing in Standard Miniseq Run
E.coli error
R1 phasing
1.2
1
0.8
0.6
0.4
0.2
0
1.50
1.25
1.00
0.75
0.50
0.25
0.00
812
963
1558
1671
1682
1745

FIG. 3B

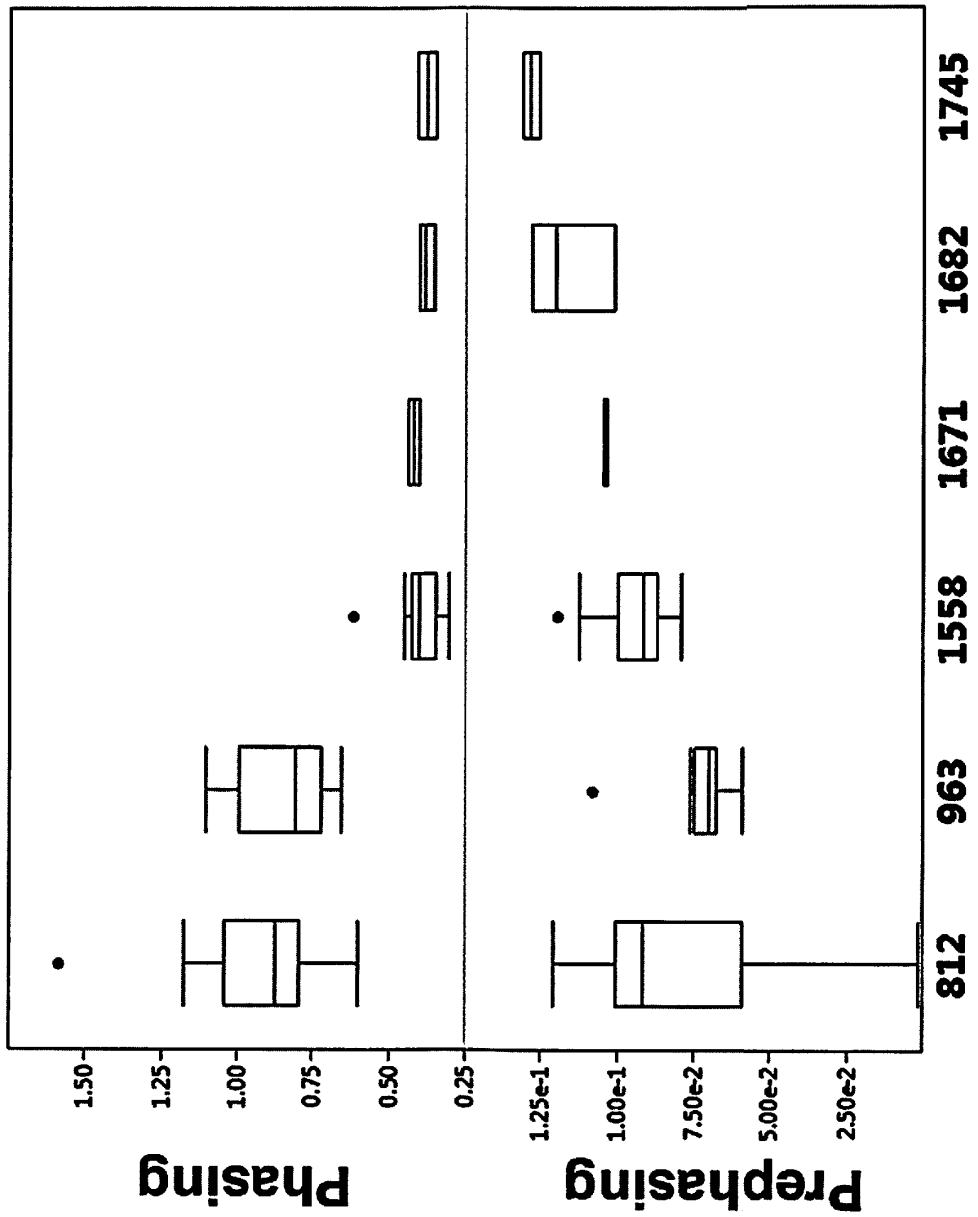

Phasing
Prephasing
1.50
1.25
1.00
0.75
0.50
0.25
1.25e-1
1.00e-1
7.50e-2
5.00e-2
2.50e-2
812
963
1558
1671
1682
1745

FIG. 4

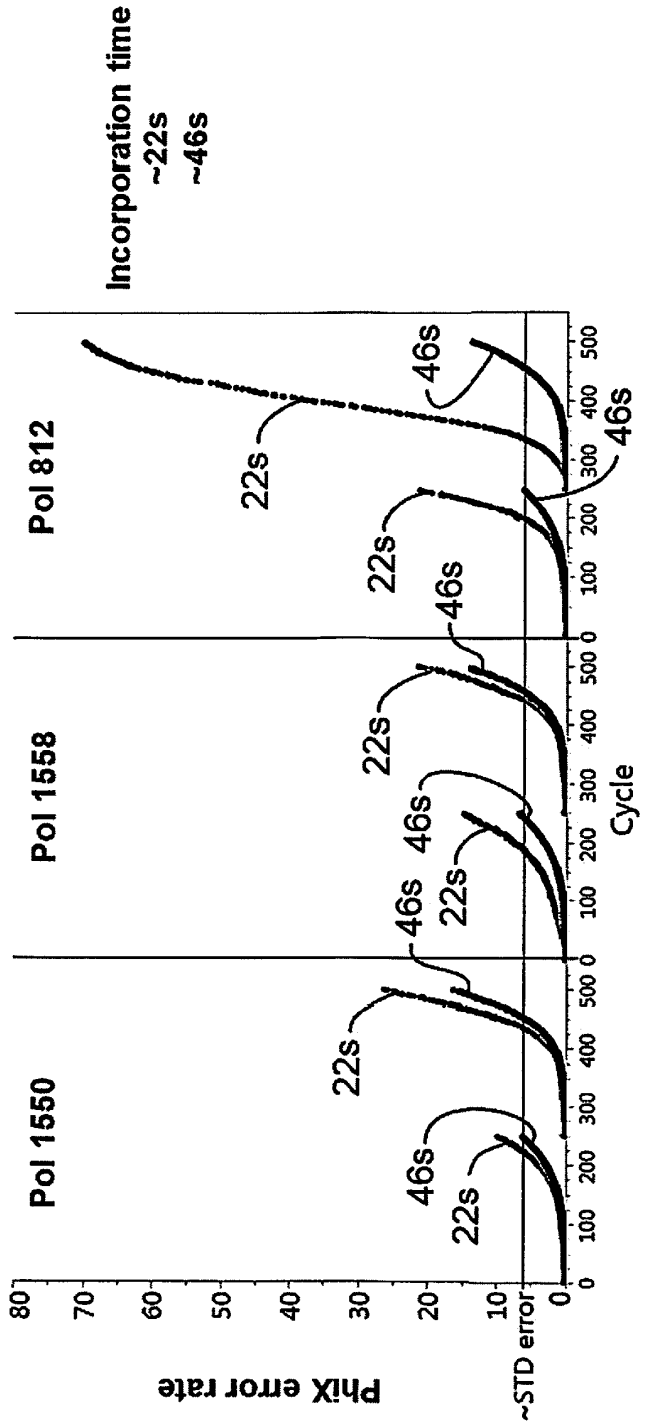

Incorporation time
~22s
~46s
Pol 1550
Pol 1558
Pol 812
Phix error rate
~STD error
Cycle
22s
46s

FIG. 5A

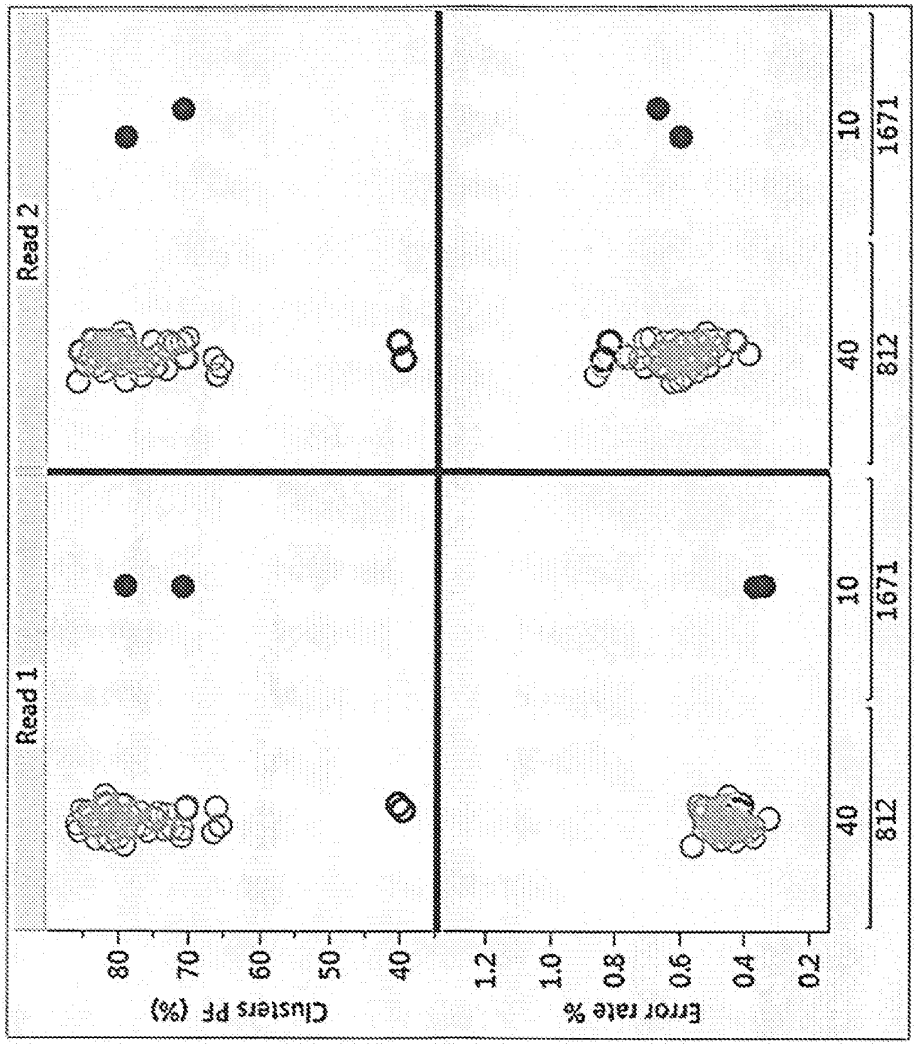

Read 2
Read 1
Clusters PF (%)
80
70
60
50
40
Error rate %
1.2
1.0
0.8
0.6
0.4
0.2
10
1671
40
812
10
1671
40
812

FIG. 5B

		S1 baseline	S1, fast	
		Pol 812	Pol 812	Pol 1671
PhiX ER	R1	0.47	0.49	0.4
PhiX ER	R2	0.6	1.11	0.65
Q30	R1	93.1	92.1	94.4
Q30	R2	89.3	84.7	88.4
Phasing	R1	0.094	0.189	0.116
Phasing	R2	0.101	0.231	0.144
Inc. Time		**40s**		**22s**