WHAT IS CLAIMED IS:

1. A Phi29 type DNA polymerase, wherein the Phi29 type DNA polymerase has an amino acid sequence of at least 80%, 85%, 90%, 95%, 99.5%, 98% or 99% sequence identity with SEQ ID NO:1, wherein the Phi29 type DNA polymerase comprises amino acid substitution K64R and optionally M97K, and wherein the Phi29 type DNA polymerase: (a) has an improved affinity for short primers compared to a wild type Phi29 polymerase with SEQ ID NO:1; or (b) is a Phi29 polymerase with improved primer recognition compared to a wild type Phi29 polymerase with SEQ ID NO:1.

2. The Phi29 type DNA polymerase of claim 1, having a sequence of SEQ ID NO:2 or SEQ ID NO:4, or having no more than 30, 29, 28, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, or 1 amino acid substitutions, additions or deletions in addition to amino acid substitution K64R and optionally M97K.

3. The Phi29 type DNA polymerase according to claim 1 or 2, wherein the Phi29 type DNA polymerase comprises amino acid substitutions K64R and M97K, and has an improved affinity for short primers in the limit between 4 and 6 nucleotides compared to a wild type Phi29 polymerase with SEQ ID NO:1.

4. Use of a Phi29 type DNA polymerase, wherein the Phi29 type DNA polymerase is a Phi29 type DNA polymerase according to any one of claims 1 to 3, for improving affinity for short primers, ideally in the limit between 4 and 6 nucleotides, compared to a wild type Phi29 polymerase with SEQ ID NO:1, preferably in a random synthetic primers based multiple displacement amplification or TruePrime DNA amplification.

5. A method for replicating, amplifying or sequencing a template DNA which comprises contacting said DNA with a reaction mixture comprising at least:

a) the DNA polymerase according to any one of claims 1 to 3,

b) a buffer,

c) magnesium chloride,

d) a primer, and

e) nucleoside triphosphates.

6. A kit for carrying out a method according to claim 5 comprising: a) the DNA polymerase according to any one of claims 1 to 3, b) a buffer, and c) magnesium chloride.

7. A kit for carrying out a method according to claim 5 comprising the DNA polymerase according to any one of claims 1 to 3, and one or more of:

(a) a PrimPol enzyme (e.g., TthPrimPol);

(b) random trimers;

(c) random tetramers;

(d) random pentamers;

(e) random heptamers;

(f) random octamers;

(g) dNTPs;

(h) reaction buffer;

(i) a buffer for use with any of the aforementioned elements.

8. An isolated nucleic acid molecule comprising a nucleotide sequence encoding a Phi29 type DNA polymerase according to any one of claims 1 to 3.

9. A recombinant nucleic acid comprising a transcription regulatory sequence operatively linked with a Phi29 type DNA polymerase of claim 8.

10. The recombinant nucleic acid of claim 9, wherein the transcription regulatory sequence comprises a bacterial or mammalian promoter.

11. The recombinant nucleic acid of claim 9 contained in a vector selected from a plasmid vector, a viral vector, a cosmid, and a transposon.

12. The recombinant nucleic acid of claim 11, comprising a cloning site positioned relative to the nucleotide sequence encoding the Phi29 type DNA polymerase such that an transcription regulatory sequence inserted into the cloning site becomes operatively linked with the nucleotide sequence encoding the Phi29 type DNA polymerase.

13. A recombinant cell comprising a recombinant nucleic acid of any one of claims 9-12.

14. A method comprising:

a) contacting a nucleic acid template molecule with a Phi29 type DNA polymerase of any one of claims 1-3, and reagents sufficient for primer extension; and

b) performing primer extension with the polymerase using the nucleic acid template.

15. The method of claim 14, wherein the reagents sufficient for primer extension comprise oligonucleotide primers.

16. The method of claim 15**,** wherein the oligonucleotide primers comprise one or more of trimers, tetramers, pentamers, hexamers, heptamers, octomers, nonamers or 10-mers.

17. The method of claim 16, wherein the primers are random primers.

18. The method of 15, wherein the oligonucleotide primers have links between five and 25 nucleotides.

19. The method of claim 14**,** wherein the reagents sufficient for primer extension comprise a primase/polymerase (e.g., TthPrimPol).

20. The method of claim 14**,** wherein primer extension is performed at a temperature about any of 31°C, 32°C, 33°C, 34°C, 35°C, 36°C, 37°C, 38°C, 39°C, 40°C, 41°C, or 42°C.

21. The method of claim 14**,** wherein the template nucleic acid molecule is present in an amount no greater than 1 ng, 100 pg, 10 pg, or 1 pg.

22. The method of claim 14**,** wherein the primer extension comprises (i) multiple displacement amplification (“MDA”) or (2) rolling circle amplification.

23. The method of claim 14**,** wherein the primer extension comprises multiple annealing and looping-based amplification cycles (MALBAC).

24. The method of any one of claims 14-23, wherein the Phi29 type DNA polymerase comprises both of substitutions K64R and M97K.