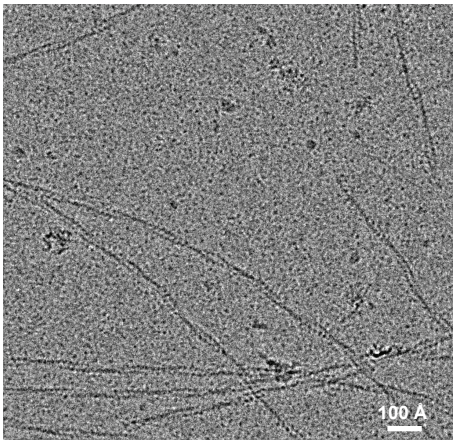
SUPPLEMENTARY 6.1

CorMR
Example micrograph



Glacios 200kV Falcon4i
(2,236 movies, 4,096x4,096 px)

cryoSPARC v4.4

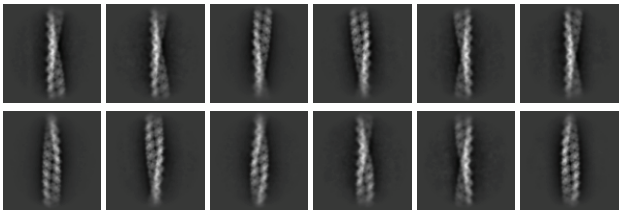
Patch motion correction
Patch CTF estimation
Curate exposure
→ **2,205 micrographs**

Filament tracer
(Filament diameter 90 Å)
Particle extraction
256x256 px
(~705k particles)

→ **2D Classification**
(50 classes)
Select 2D classes
(3 classes with ~307k particles)

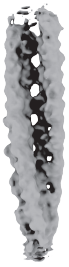
→ **Filament tracer**
(Filament diameter 100 Å,
25 Å separation distance)
→ **Particle extraction**
512x512 px
(~424k particles)

2D Classification
(100 classes)
Select 2D classes
(22 classes with ~311k particles)



Representative 2D classes

Ab-initio reconstruction
(C1 symmetry, ~282k particles)



→ **Homogeneous refinement**
(C1 symmetry, ~282k particles)

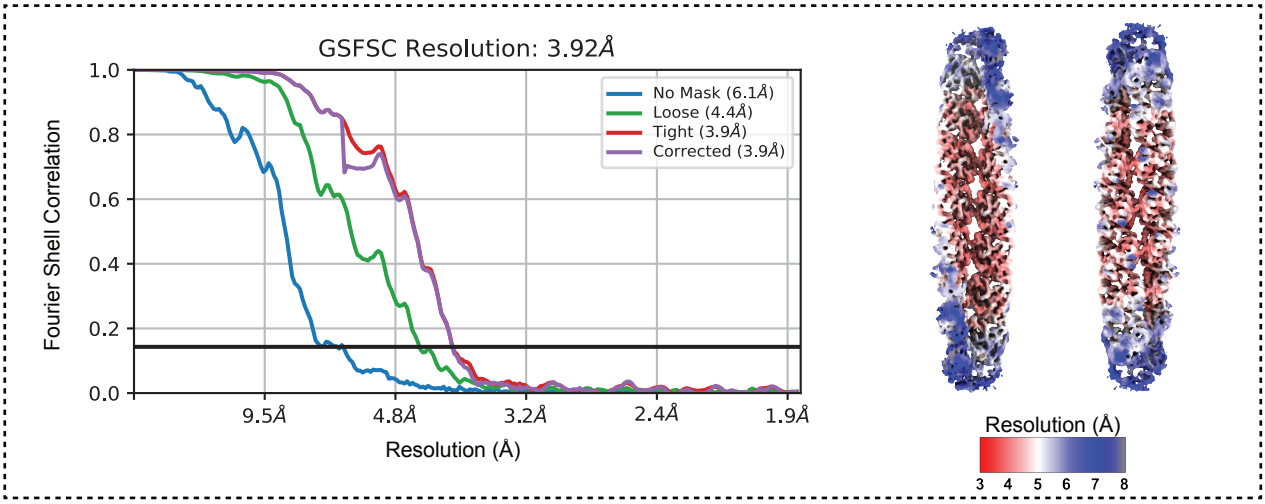
→ **Helical refinement**
(*Helical twist -18° , rise 46.5 Å
~282k particles)

Final map: 3.92 Å
(124,109 particles)
Helical twist: -15.75°
Helical rise: 46.427 Å
Bfactor: 111.2 Å^{-2}

Local refinement
Local CTF refinement
Local refinement
(~282k particles)

→ **Remove duplicate particles**
(~109k particles discarded)
Homogeneous refinement
(C2 symmetry, ~173k particles)

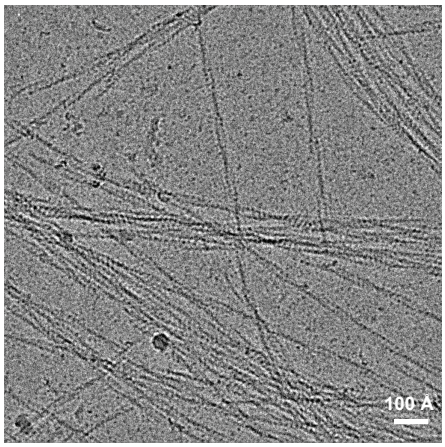
→ **Remove duplicate particles**
(~49k particles discarded)
Homogeneous refinement
(C2 symmetry, ~124k particles)



Cryo-EM image processing strategy applied to obtain CorM filament structure in the presence of CorR.

SUPPLEMENTARY 6.2

$^{\Delta 1\text{-}40}$CorM
Example micrograph



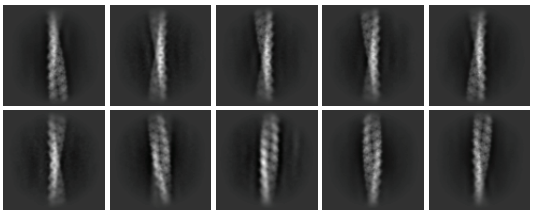
Glacios 200kV Falcon4i
(3,162 movies, 4,096x4,096 px)

cryoSPARC v4.4

Patch motion correction
Patch CTF estimation
Curate exposure
→ **1,200 micrographs** →
Filament tracer
(Filament diameter 100 Å,
25 Å separation distance) →
Particle extraction
512x512 px
(~731k particles)

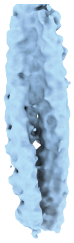
2D Classification
(75 classes)

Select 2D classes
(10 classes with ~385k particles)



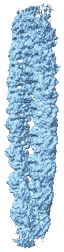
Representative 2D classes

Ab-initio reconstruction
(C1 symmetry, ~287k particles)

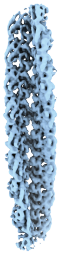


44.2 %

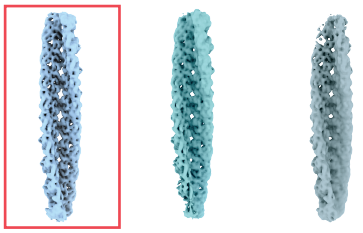
Homogeneous refinement
(C1 symmetry, ~287k particles)



Helical refinement
(*Helical twist -15.73°, rise 47.3 Å
~287k particles)



3D Classification

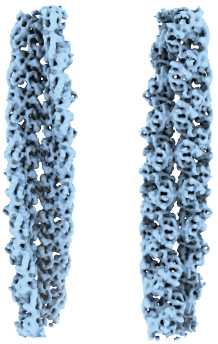


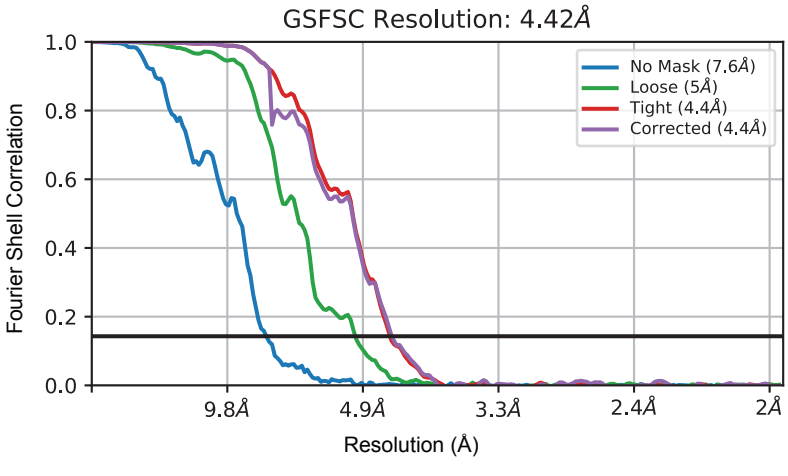
44.2 % **30.9 %** **24.9 %**

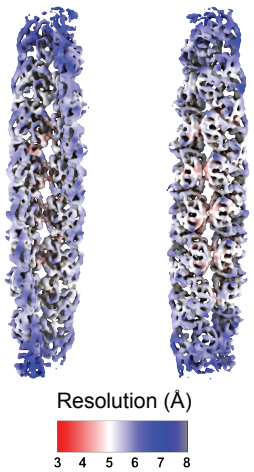
Select class I
(~127k particles,
discard bad classes)

Helical refinement
(Helical twist -16°, rise 47 Å
~127k particles)

Final map: 4.42 Å
(127,289 particles)
Helical twist: -15.344°
Helical rise: 47.294 Å
Bfactor: 108 Å^{-2}



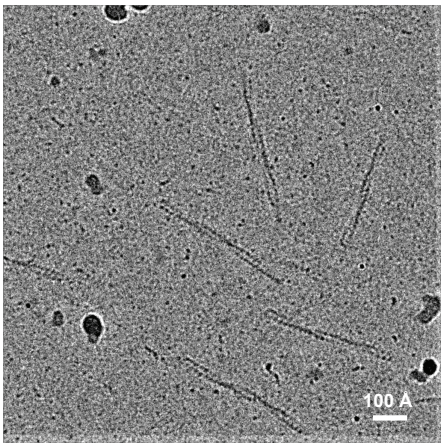




Cryo-EM image processing strategy applied to obtain N40_CorM filament structure.

SUPPLEMENTARY 6.3

CorM
Example micrograph



Glacios 200kV Falcon4i
(2,206 movies, 4,096x4,096 px)

cryoSPARC v4.4

Patch motion correction
Patch CTF estimation
Curate exposure
→ **2,147 micrographs**

Filament tracer
(Filament diameter 100 Å,
5 Å separation distance)
Particle extraction
512x512 px
(~2M particles)

→ **2D Classification**
(100 classes)
Select 2D classes
(22 classes with ~333k particles)

Filament tracer
(Filament diameter 100 Å,
1 Å separation distance)

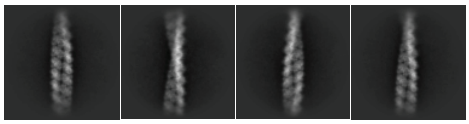
→ **Particle extraction**
360x360 px
(~6M particles)

↓ **2D Classification (4X)**

↓ **Ab-initio reconstruction**
Homogeneous refinement
(C1 symmetry, ~227k particles)

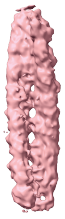
↓ **Re-extract particles**
512x512 px
(~211k particles)

↓ **2D Classification**
Select 2D classes
(7 classes with ~197k particles)



Representative 2D classes

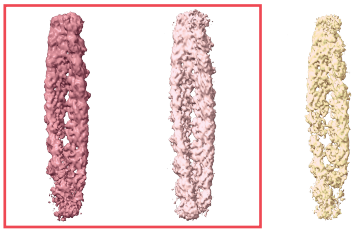
← **Ab-initio reconstruction**
(C1 symmetry, ~197k particles)



← **Homogeneous refinement**
(C1 symmetry, ~197k particles)

← **Helical refinement**
(*Helical twist -18.5°, rise 46.5 Å
~197k particles)

↓ **3D Classification**

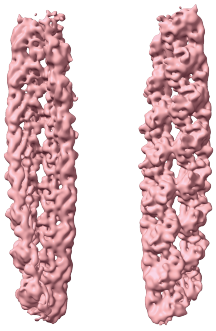


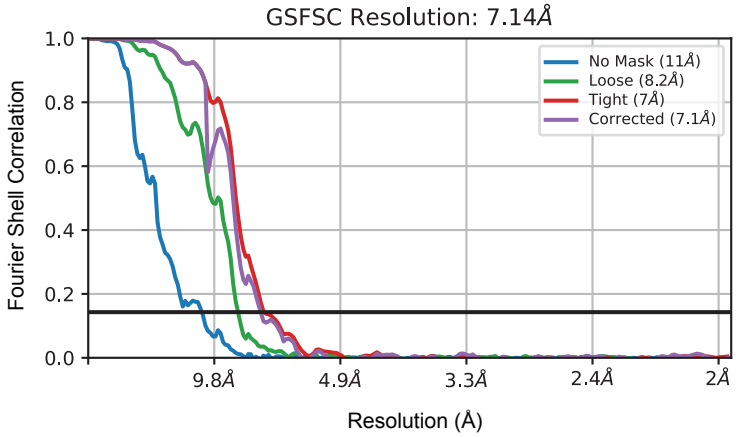
41.6 % **36.7 %** **21.7 %**

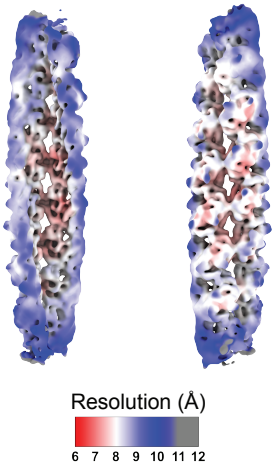
→ **Select class I & II**
(~154k particles,
discard bad class)

→ **Helical refinement**
(Helical twist -18.5°, rise 46.5 Å
~154k particles)

→ **Final map: 7.14 Å**
(154,726 particles)
Helical twist: -18.5°
Helical rise: 46.5 Å
Bfactor: 420.3 Å^{-2}



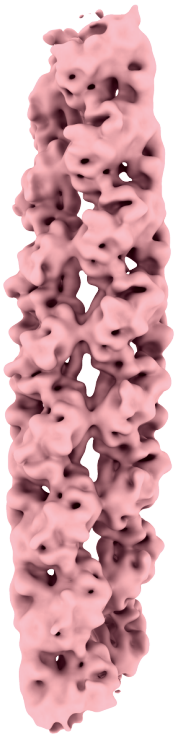




Cryo-EM image processing strategy applied to obtain CorM filament structure.

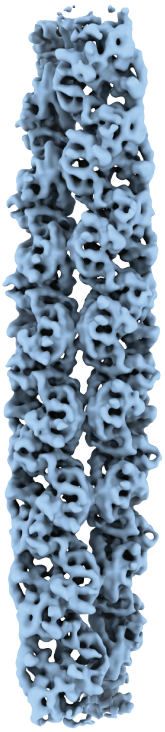
SUPPLEMENTARY 6.4

A



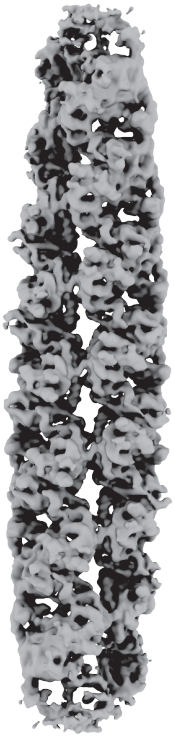
7.1 Å
CorM

B



4.4 Å
$^{\Delta 1\text{-}40}$CorM

C



3.9 Å
CorMR