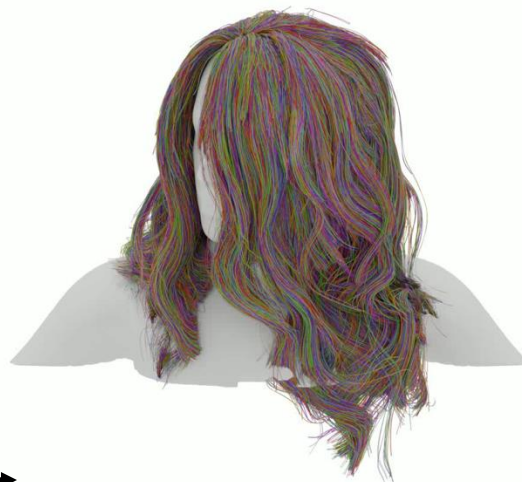


DGH: Dynamic Gaussian Hair



Our goal



Static Hair

Deformed Hair

Dynamic Hair

Novel View Synthesis

Contributions

We introduce **Dynamic Gaussian Hair (DGH)**, a two-stage data-driven method that effectively generates hair dynamics and photo realistic renderings.

- **Coarse-to-Fine Hair Dynamics Framework**

We introduce a coarse-to-fine hair dynamics framework as Stage 1 of our method, learning hair deformations based on head motions for structured motion representation.

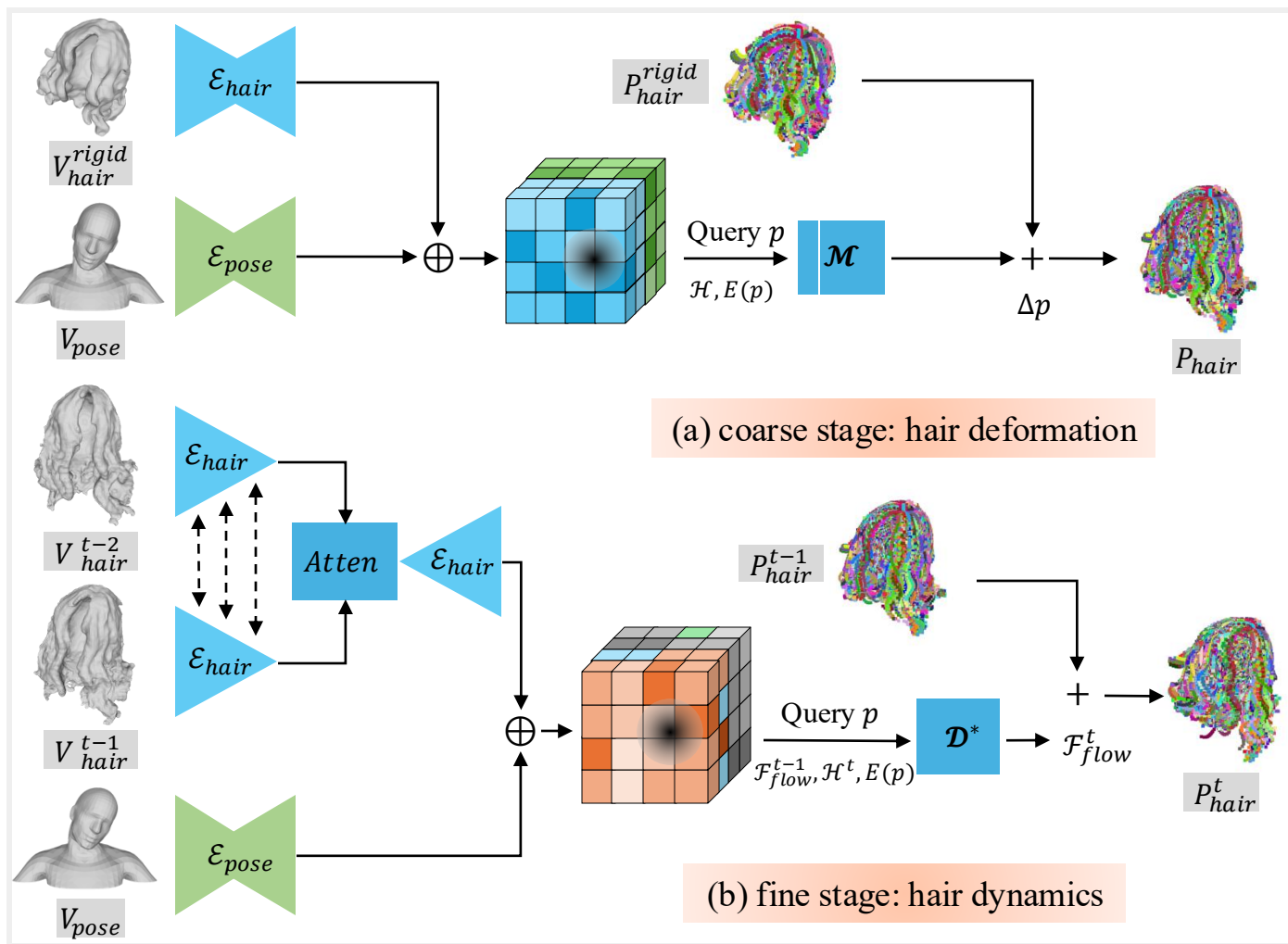
- **Dynamic 3D Gaussian Splatting (GS) Hair Representation**

Extending traditional GS, our approach enables time-varying hair motion, allowing efficient tracking and deformable rendering beyond static GS methods.

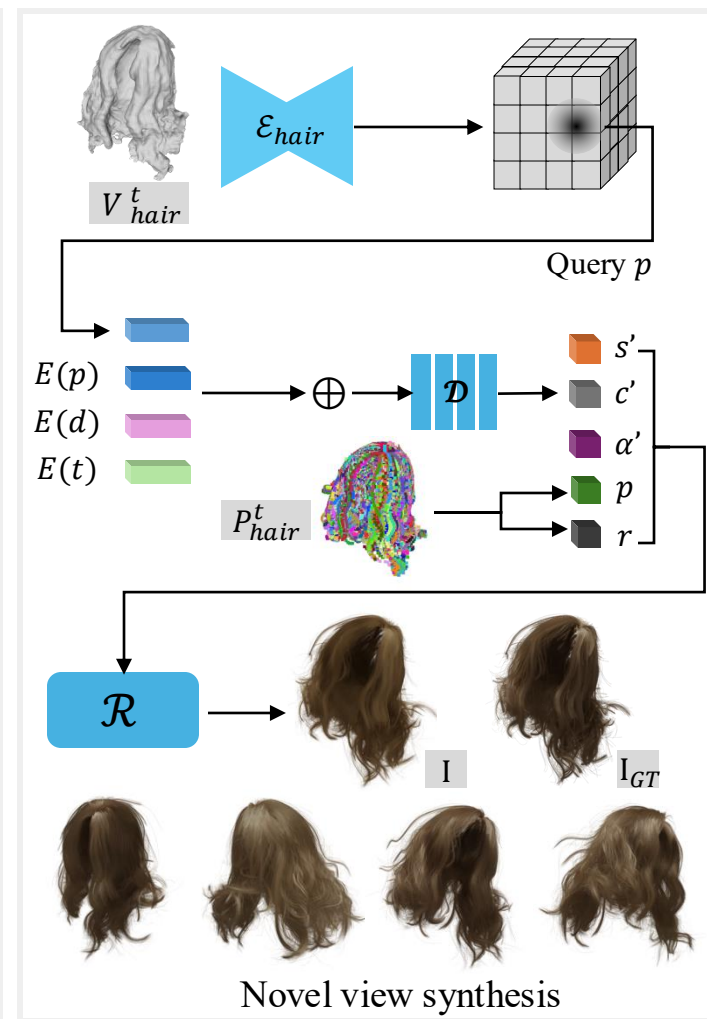
- **Fast Novel View Synthesis with GS Half-Body Integration**

Our method can merge dynamic GS hair with pre-trained GS avatars, achieving efficient, high-fidelity rendering of realistic hair motion from novel viewpoints.

Framework



Stage I: Coarse-to-fine dynamic hair modeling



Stage II: Appearance optimization

Comparison

Comparison

→ Dynamic hair



3DGS [1] w/o
hair deformation



GH [2] w/o
hair deformation



Ours w/o
hair deformation



Ours
hair deformation

[1] Kerbl, Bernhard, et al. "3D Gaussian Splatting for Real-Time Radiance Field Rendering." *ACM Trans. Graph.* 42.4 (2023): 139-1.

[2] Zakharov, Egor, et al. "Human Hair Reconstruction with Strand-Aligned 3D Gaussians." *European Conference on Computer Vision*. Springer, Cham, 2025.

Comparison

→ Dynamic hair



3DGS [1] w/o
hair deformation



GH [2] w/o
hair deformation



Ours w/o
hair deformation



Ours
hair deformation

[1] Kerbl, Bernhard, et al. "3D Gaussian Splatting for Real-Time Radiance Field Rendering." *ACM Trans. Graph.* 42.4 (2023): 139-1.

[2] Zakharov, Egor, et al. "Human Hair Reconstruction with Strand-Aligned 3D Gaussians." *European Conference on Computer Vision*. Springer, Cham, 2025.

Comparison

→ Dynamic hair



3DGS [1] w/o
hair deformation



GH [2] w/o
hair deformation



Ours w/o
hair deformation



Ours
hair deformation

[1] Kerbl, Bernhard, et al. "3D Gaussian Splatting for Real-Time Radiance Field Rendering." *ACM Trans. Graph.* 42.4 (2023): 139-1.

[2] Zakharov, Egor, et al. "Human Hair Reconstruction with Strand-Aligned 3D Gaussians." *European Conference on Computer Vision*. Springer, Cham, 2025.

Comparison

→ Dynamic hair novel view synthesis



3DGS [1] w/
GT hair deformation



GH [2] w/
GT hair deformation



Ours w/
GT hair deformation



GT

[1] Kerbl, Bernhard, et al. "3D Gaussian Splatting for Real-Time Radiance Field Rendering." *ACM Trans. Graph.* 42.4 (2023): 139-1.

[2] Zakharov, Egor, et al. "Human Hair Reconstruction with Strand-Aligned 3D Gaussians." *European Conference on Computer Vision*. Springer, Cham, 2025.

Comparison

→ Dynamic hair novel view synthesis



3DGS [1] w/
GT hair deformation



GH [2] w/
GT hair deformation



Ours w/
GT hair deformation



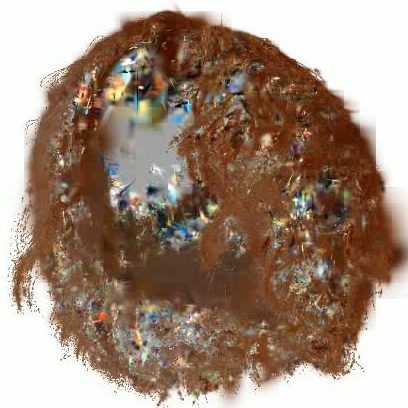
GT

[1] Kerbl, Bernhard, et al. "3D Gaussian Splatting for Real-Time Radiance Field Rendering." *ACM Trans. Graph.* 42.4 (2023): 139-1.

[2] Zakharov, Egor, et al. "Human Hair Reconstruction with Strand-Aligned 3D Gaussians." *European Conference on Computer Vision*. Springer, Cham, 2025.

Comparison

→ Dynamic hair novel view synthesis



3DGS [1] w/
GT hair deformation



GH [2] w/
GT hair deformation



Ours w/
GT hair deformation



GT

[1] Kerbl, Bernhard, et al. "3D Gaussian Splatting for Real-Time Radiance Field Rendering." *ACM Trans. Graph.* 42.4 (2023): 139-1.

[2] Zakharov, Egor, et al. "Human Hair Reconstruction with Strand-Aligned 3D Gaussians." *European Conference on Computer Vision*. Springer, Cham, 2025.

Ablation

Ablation

→ w/ & w/o our hair deformation (stage I)



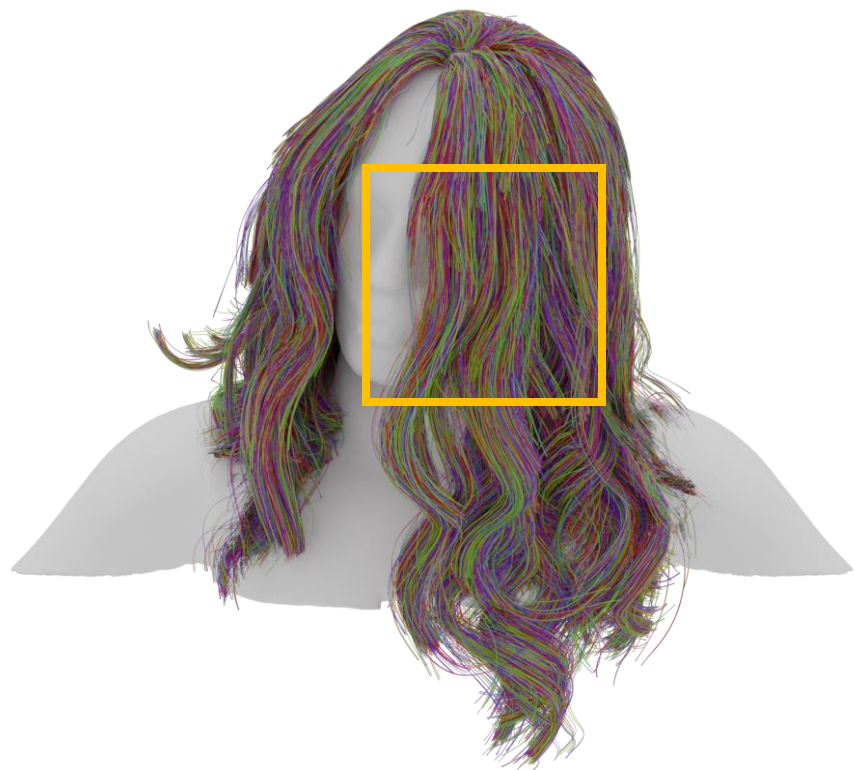
Rigid transformed hair
w/o hair deformation



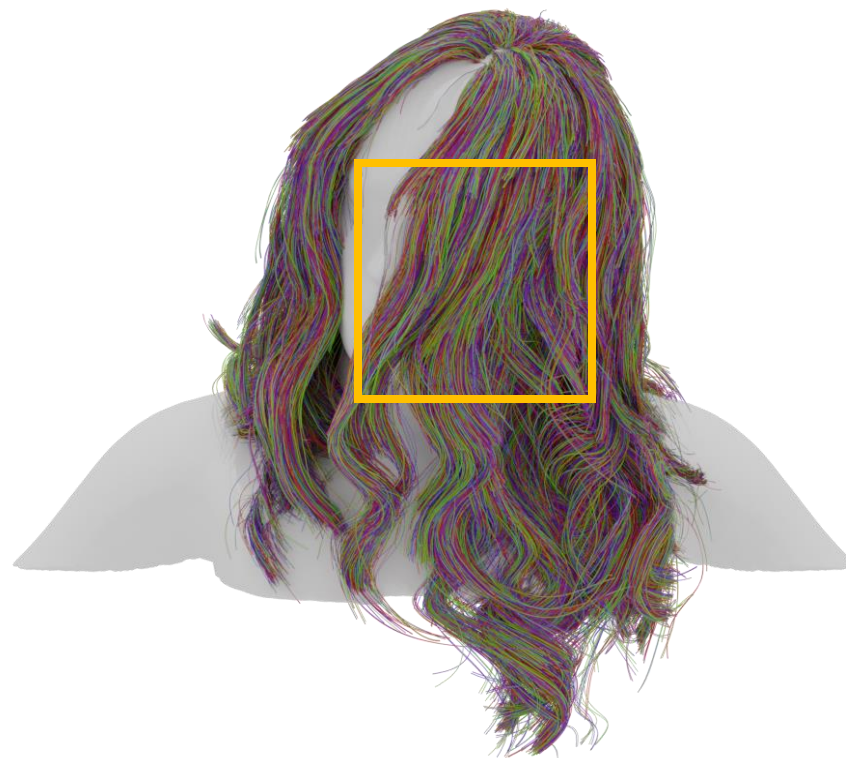
Ours
w/ hair deformation

Ablation

→ Coarse-to-fine



Ours coarse stage



Ours fine stage

Ablation

→ Coarse-to-fine



Ours coarse stage



Ours fine stage

Ablation

→ Appearance



Ours w/o tangent & blending

Ours w/o blending

Ours

GT

Ablation

→ Appearance



Ours w/o tan. & blending



Ours w/o blending



Ours



GT

Results

More results

→ Test results at different velocities



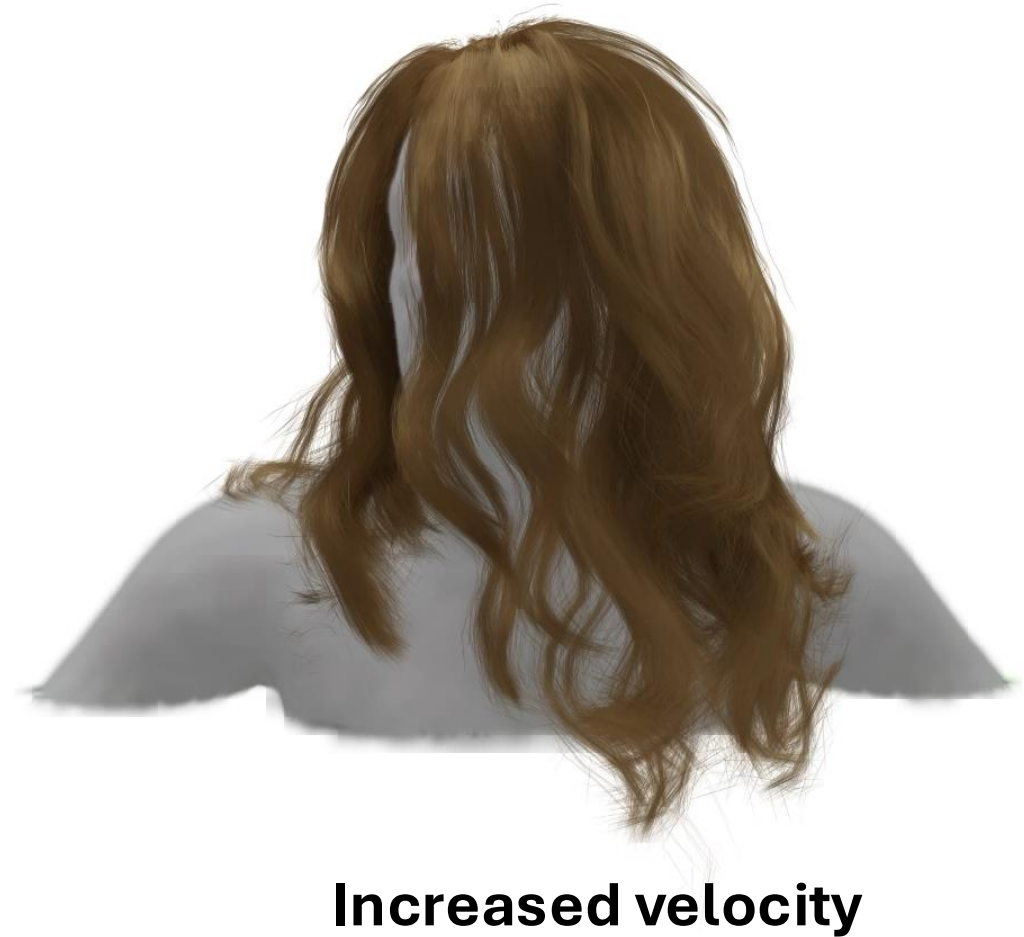
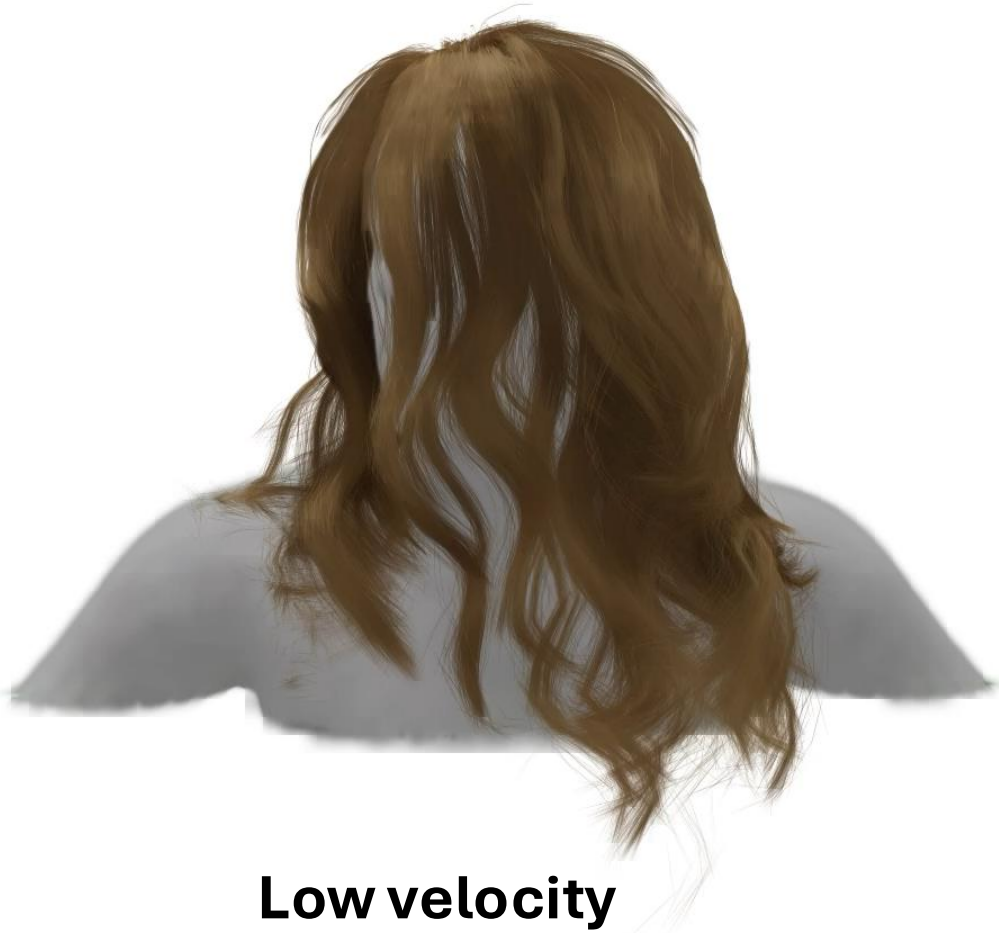
Low velocity



Increased velocity

More results

→ Test results at different velocities



More results

→ Short hair



Short hair 1



Short hair 2

More results

→ Long Hair



Long hair 1



Long hair 2

More results

→ Curly Hair



Curly hair 1



Curly hair 2

More results

→ Ponytail



Ponytail 1



Ponytail 2

Thank you !