

FUJIFILM'S ATOMM TECHNOLOGY

-- Its Benefits and Applications --



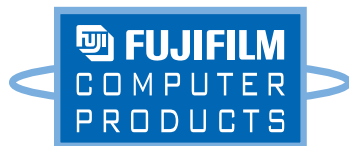
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July 22, 1998

Presented at the THIC meeting at the Villa Hotel, San Mateo CA 94403-4537



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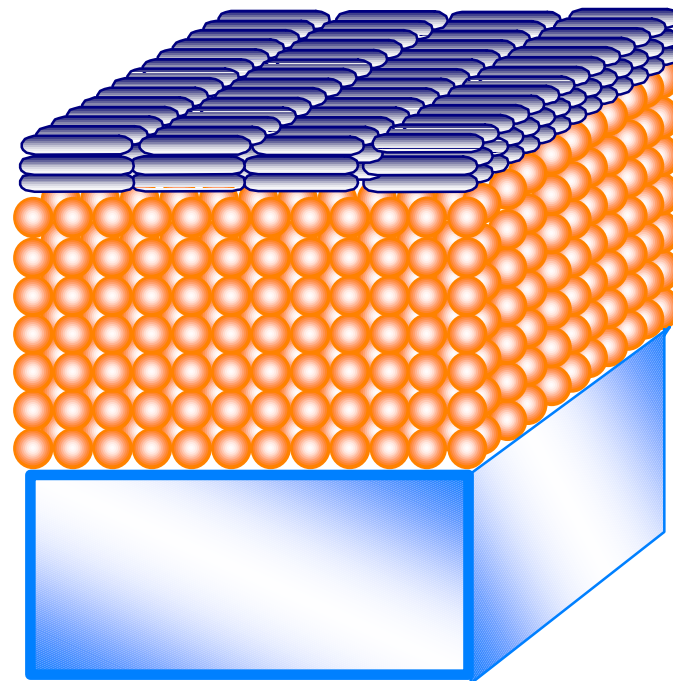
Fujifilm Computer Products

FUJI PHOTO FILM U.S.A., INC.

For Additional Information Call 1-800-488-FUJI (3854)

Developments in Ultra Thin-Coated Media

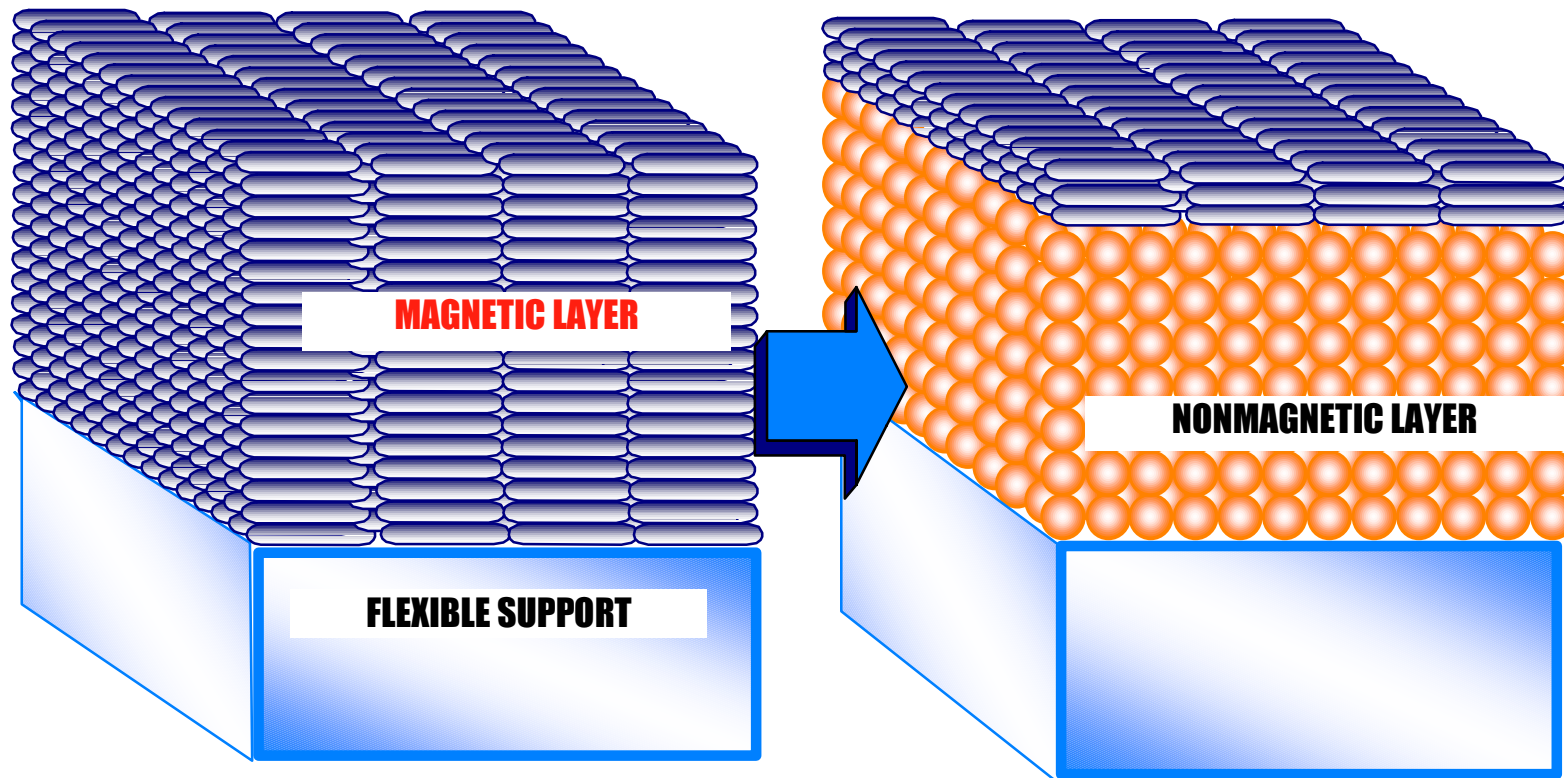
Fujifilm ATOMM Technology



Advanced super
Thin-layer and high-
Output
Metal
Media

ATOMM TAPE TECHNOLOGY

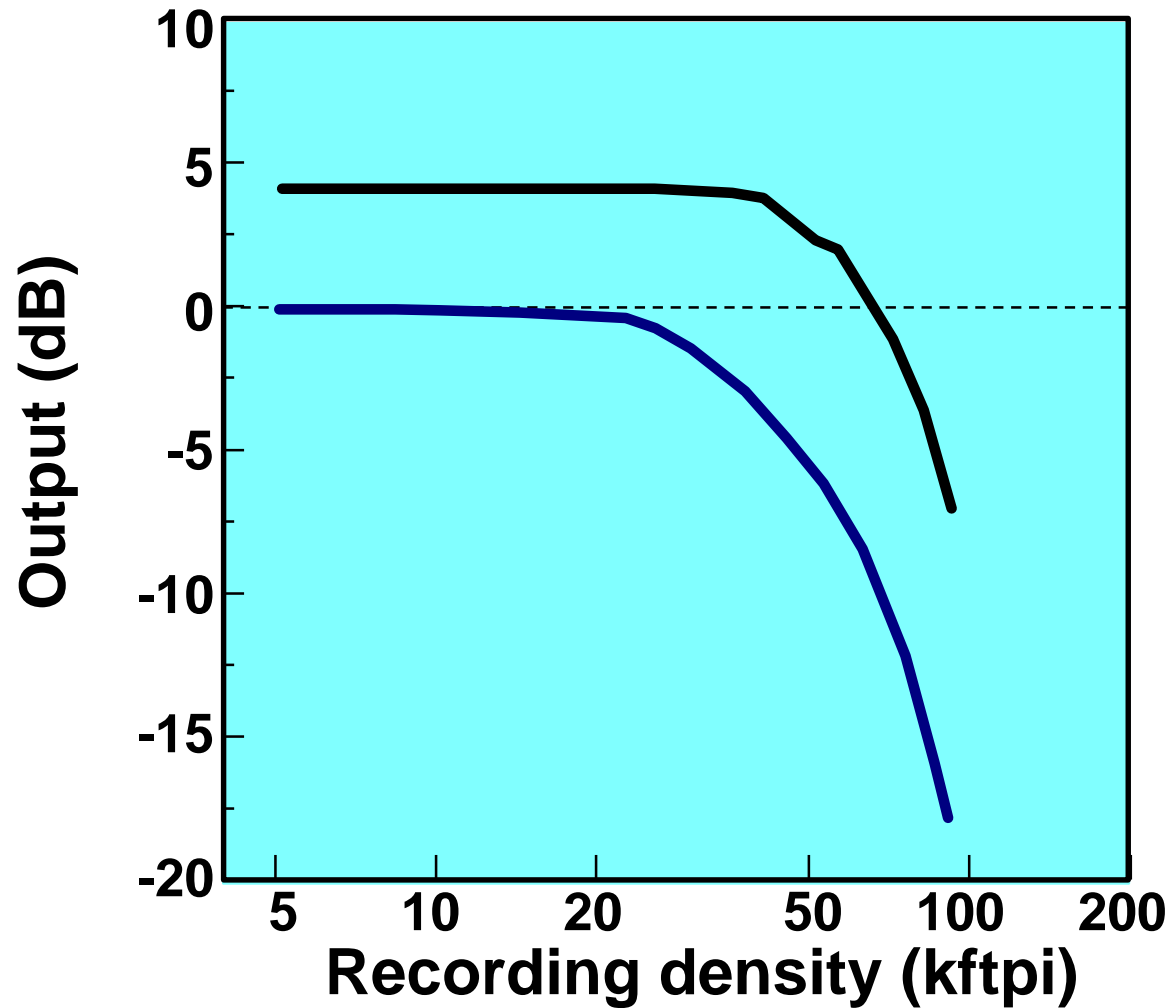
Ultrathin magnetic layer with double layer structure



Advantages of ATOMM

- Higher Output at Short Wavelength
- Lower Noise - Smoother Surface
- Superior Running Durability
- More Environmentally Stable
- Mass Production

Recording Density Characteristics



ATOMM MF - 2HD

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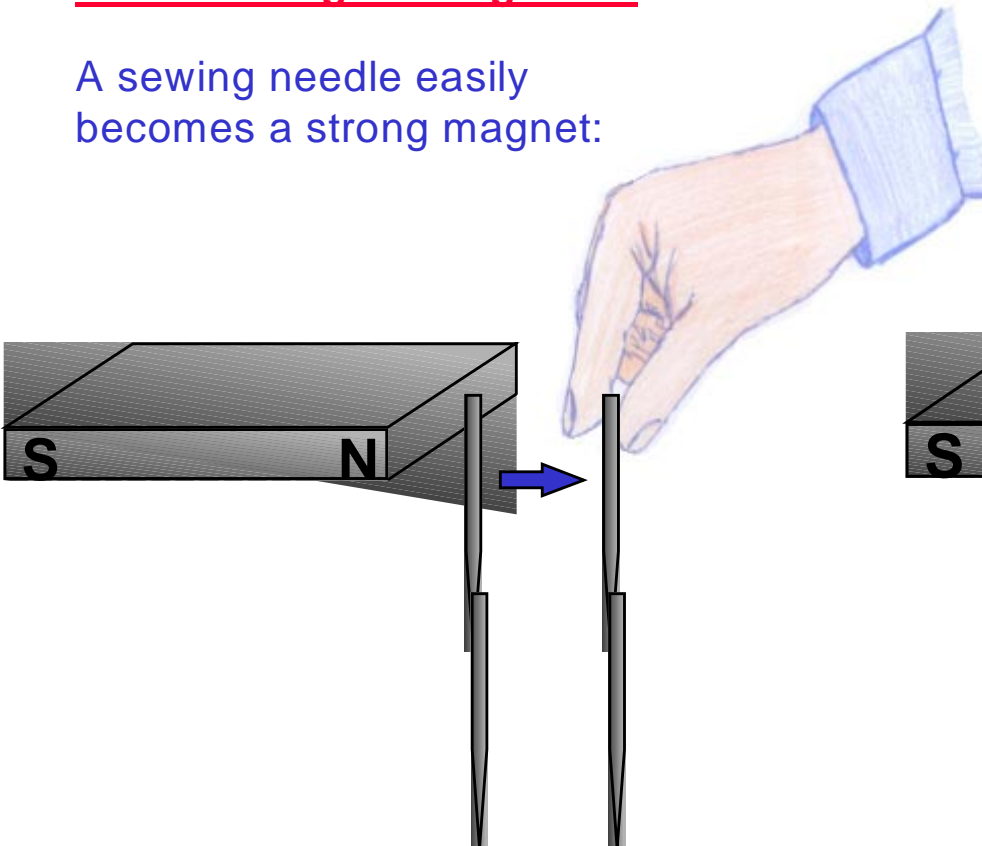
ATOMM-DISK has an 8db higher signal output than conventional floppy disks at 50 Kftpi.

A thinner magnetic layer creates a stronger magnetic signal at higher densities (short wavelength signals).

Coating thicknesses beyond a thickness equal to 1/4 to 1/3 of the recording wavelength (bit length) reduces the magnetic signal through the demagnetization effect.

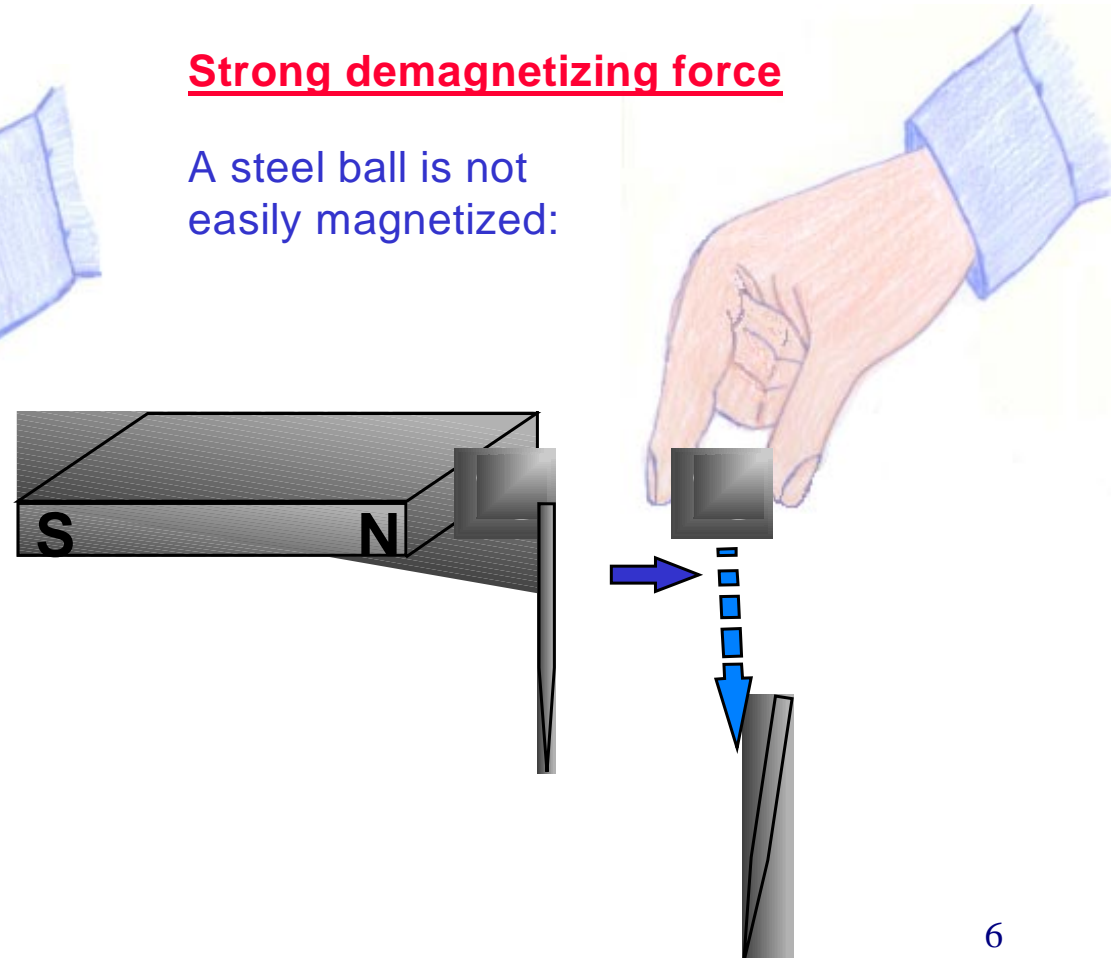
Weak demagnetizing force

A sewing needle easily becomes a strong magnet:



Strong demagnetizing force

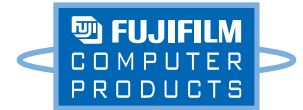
A steel ball is not easily magnetized:



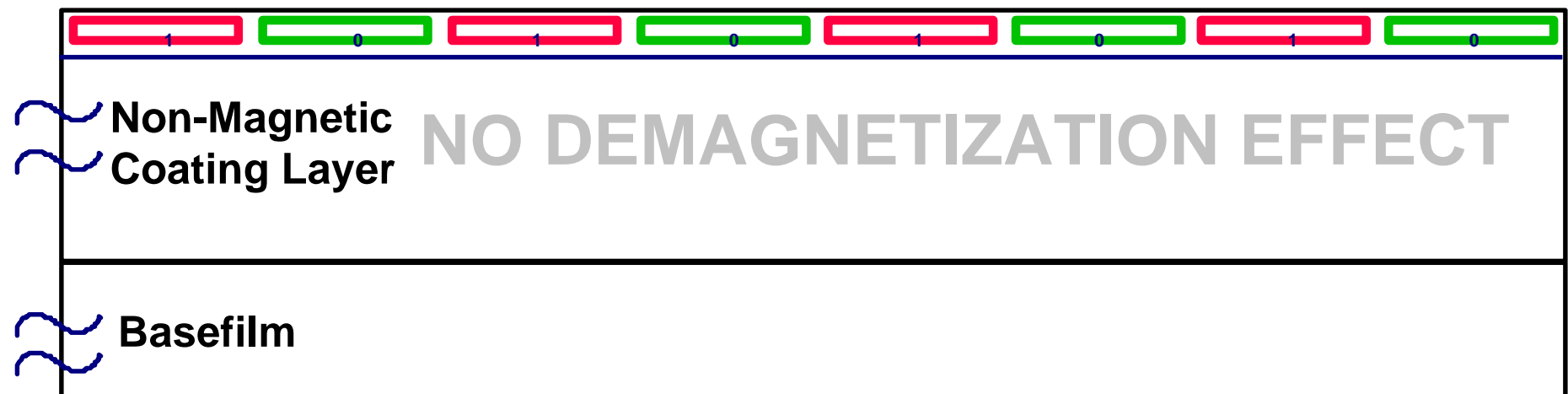
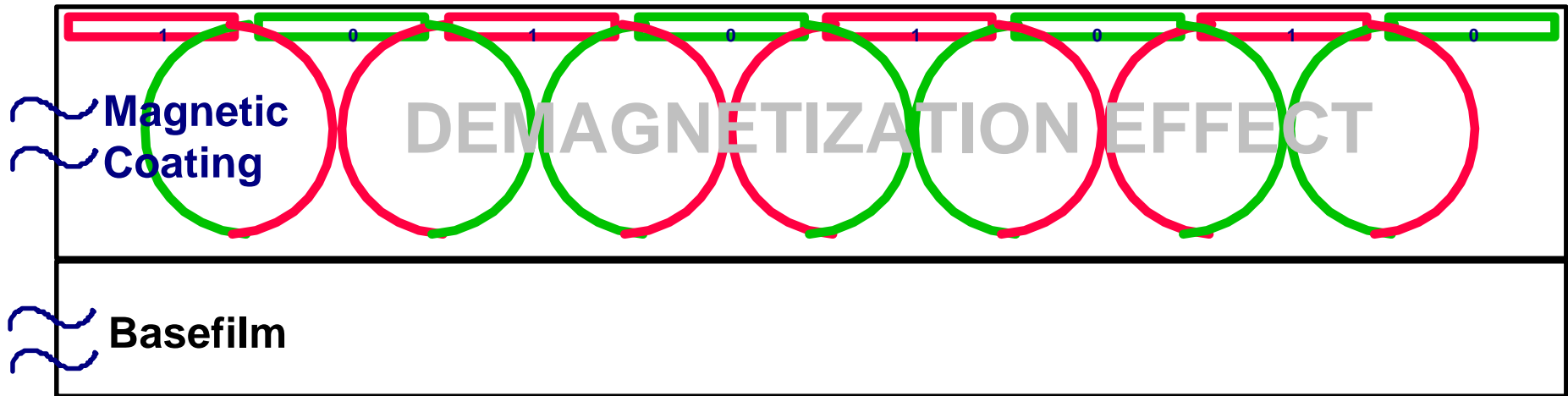
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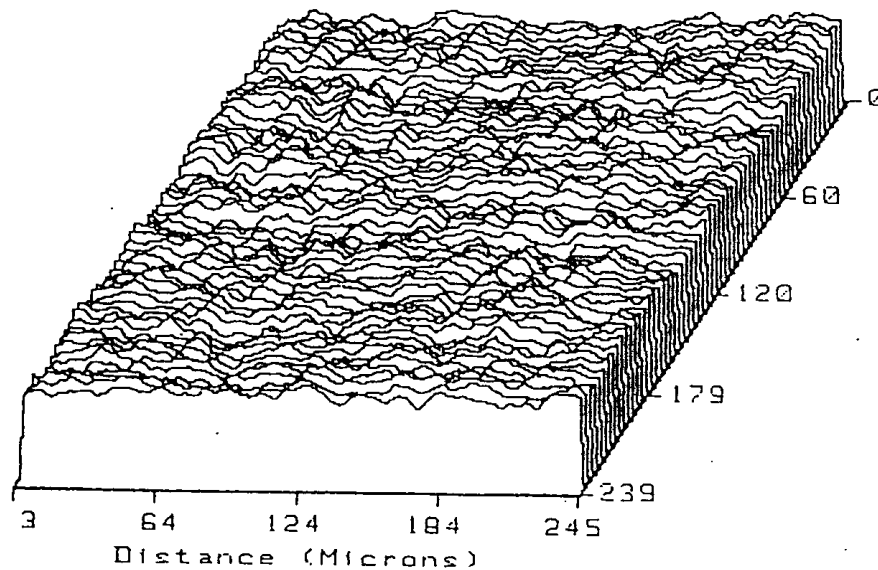
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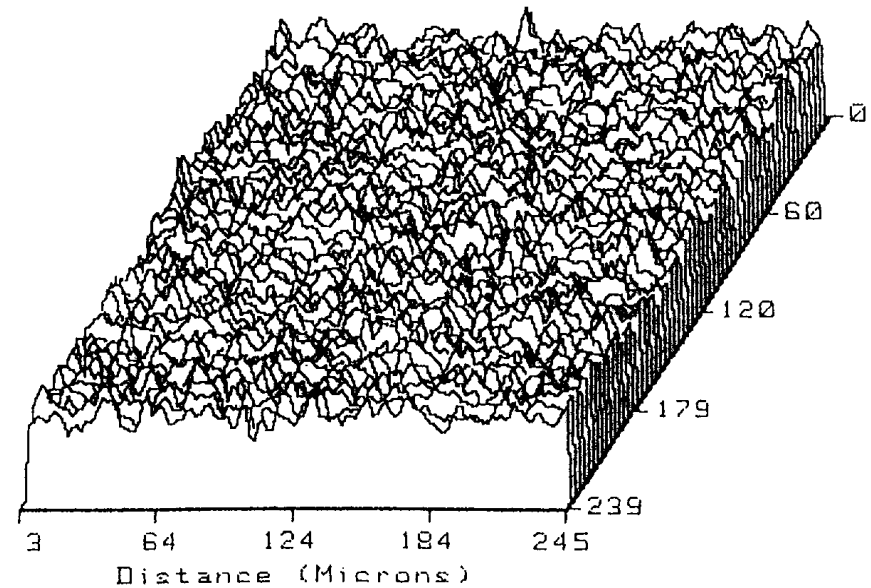
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Smoother Surface of **ATOMM** Technology



Thin layer MP
(**ATOMM** Media)



Conventional MP

Superior Wear Resistance

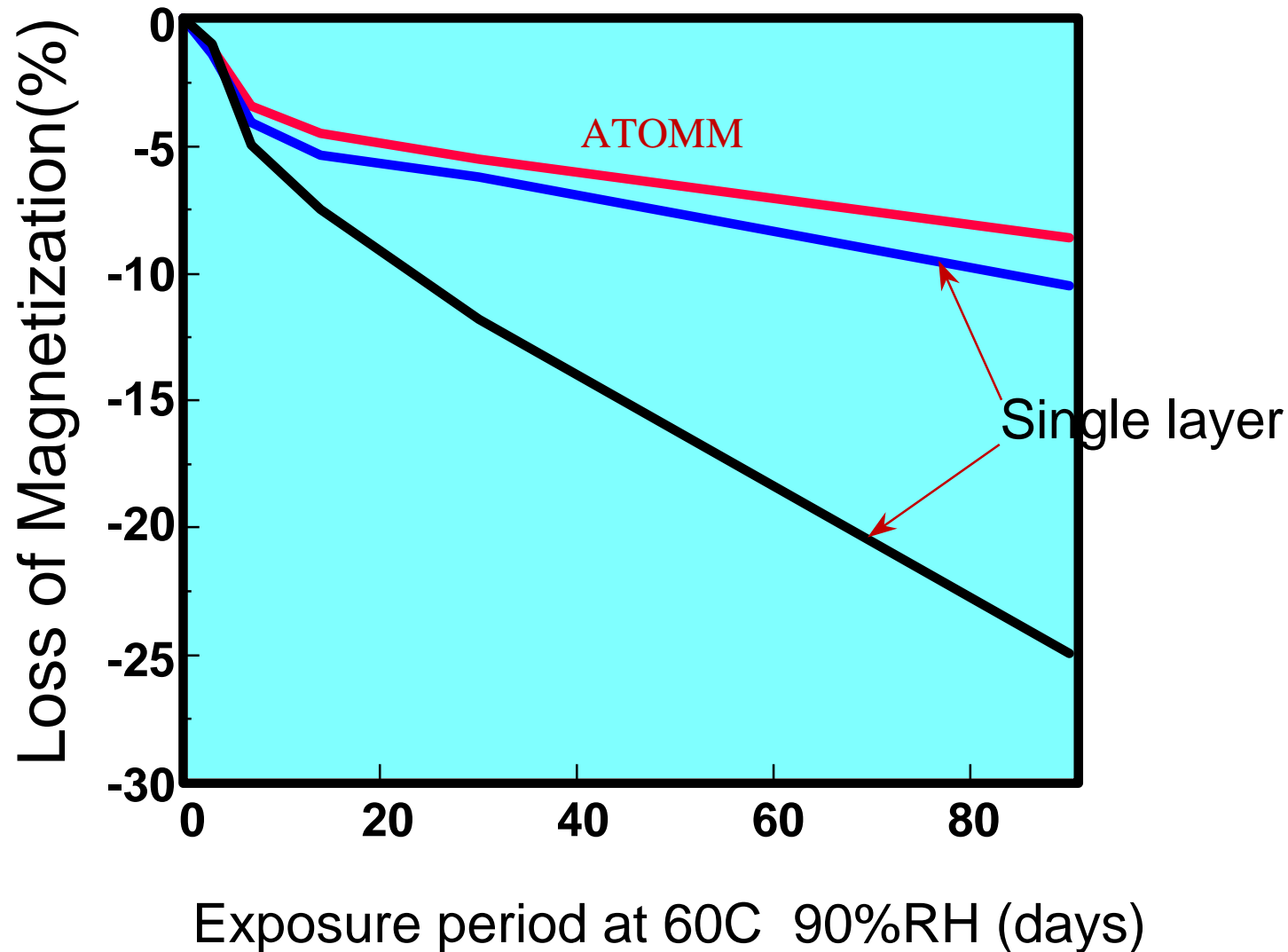
ATOMM's Smoother Surface ➡ More stable clean running performance.

Fujifilm's High Molecular Weight Binder with Advanced Stability ➡ Resists time fatigue and environmental effects.

ATOMM's Better Lubricant Replenishment ➡ Lubricant optimization in both layers with lower-layer reservoir function for longer lasting protection.

ATOMM's Lower-Layer Cushioning Function ➡ Better head-to-media contact and durability.

Storage reliability of ATOMM

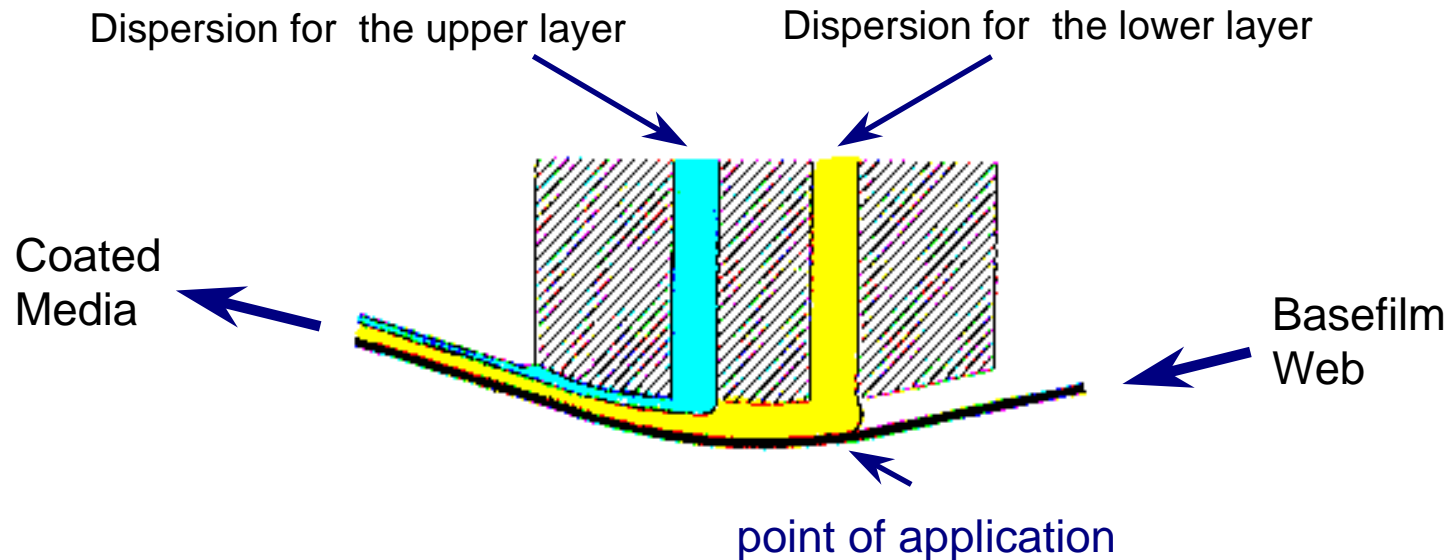


ATOMM - TECHNOLOGY

Performance Benefits

- **High Capacity** - Achievable by Upper Layer with Dual Coating
- **High Output** - Attributable to Thin Magnetic Upper Layer
- **Excellent Durability** - Attributable to MP with Titan-Fine Lower Layer
- **Better Archival Life** - Attributable to Thin Magnetic Layer

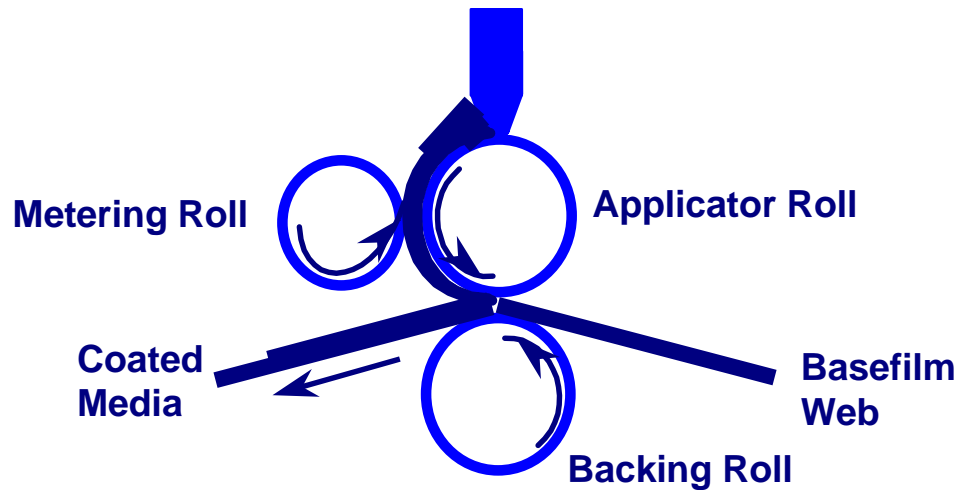
Fujifilm began coating motion picture and photographic film in the mid 1930's using die coating technology. In 1960 simultaneous multi-coating technology was developed. Also in 1960, Fujifilm produced its first magnetic tape products. In 1965, Fujifilm began manufacturing computer tape. Fujifilm's computer floppy disks were introduced in 1977. Fujifilm began manufacturing dual-coated magnetic media in 1989 and ATOMM dual-coated media in 1992. For ATOMM, Fujifilm's special die coating head applies two separate formulation layers at different depths and thicknesses simultaneously.



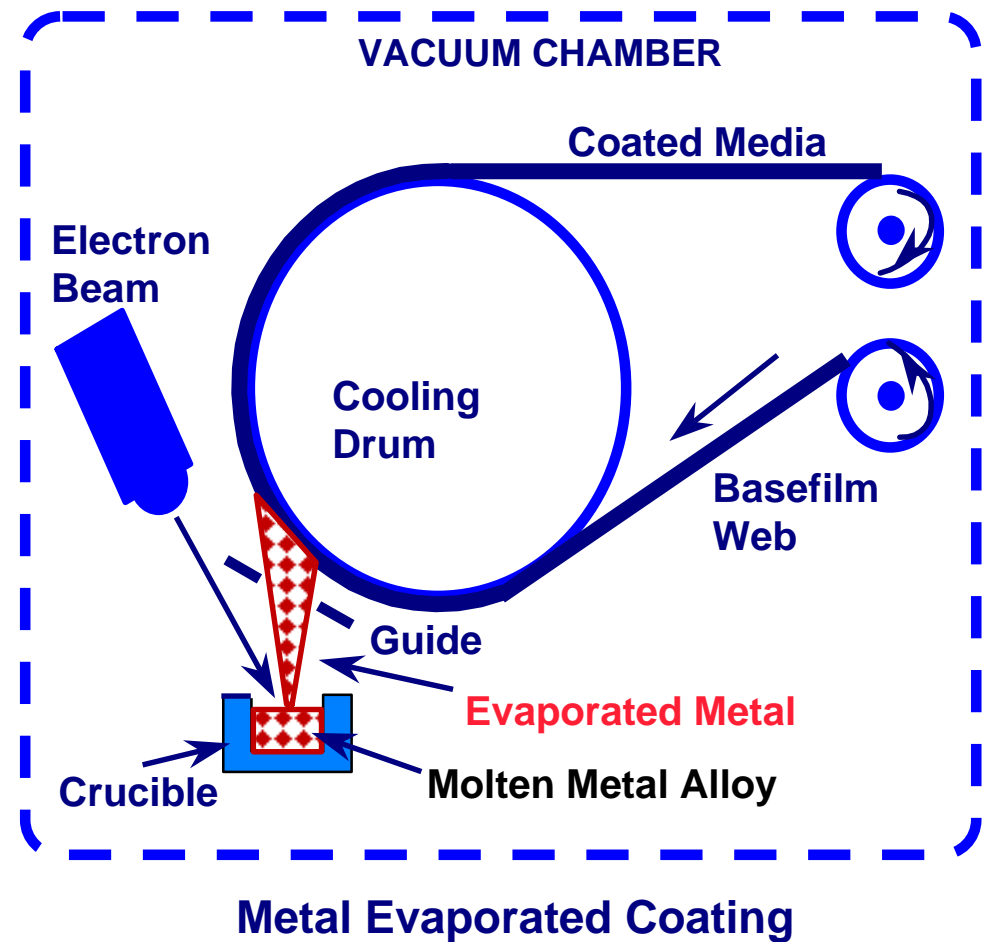
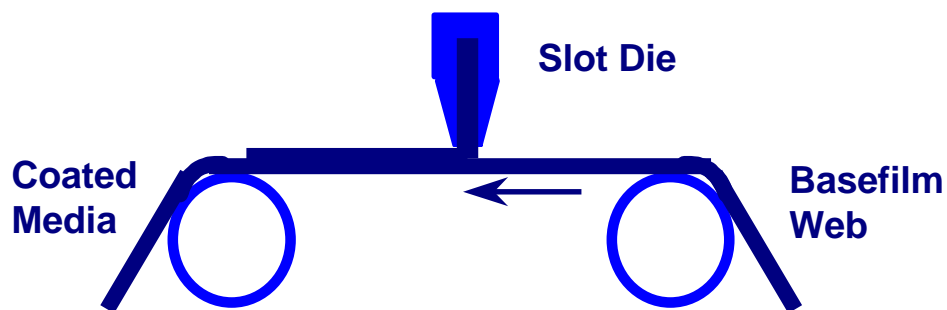
Fujifilm Simultaneous Dual-Coating Method

Coating Technologies

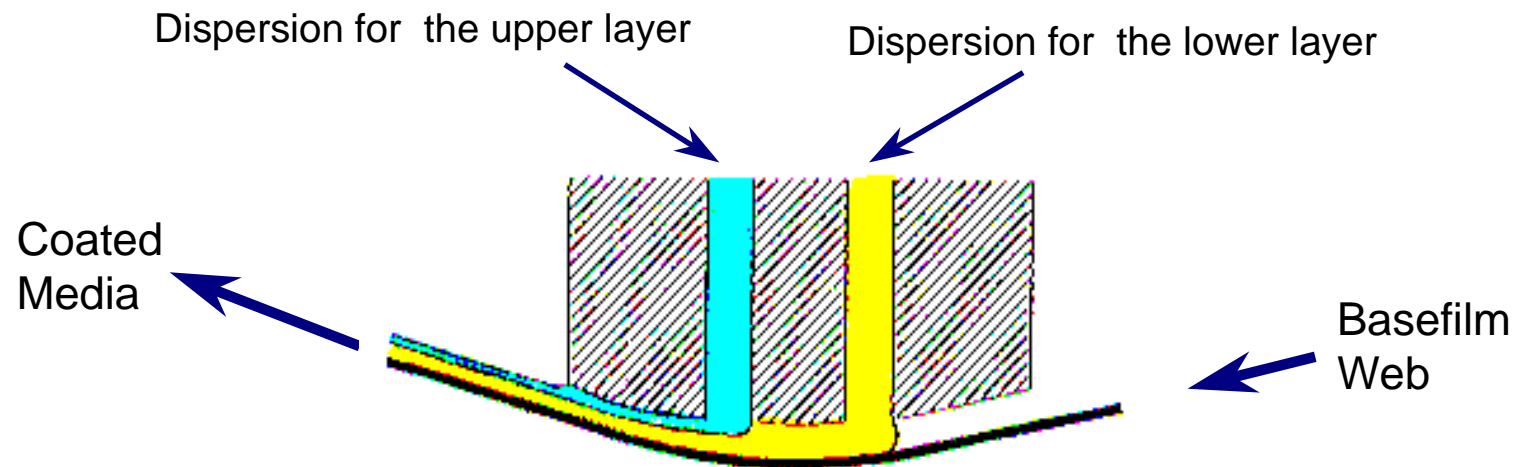
Reverse Roll Coating



Slot Die Coating

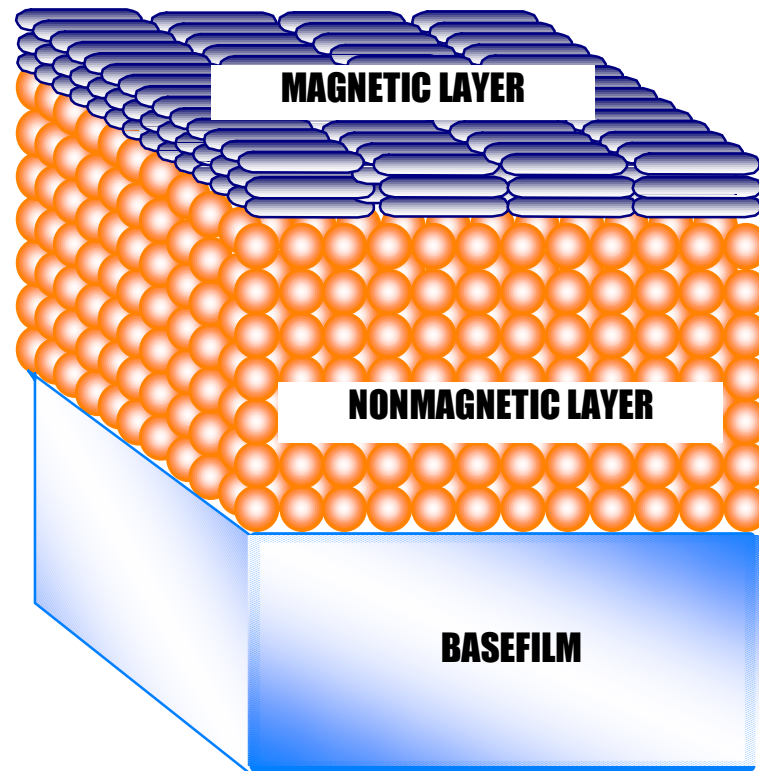


Fujifilm has *always* employed the die-coating manufacturing process!



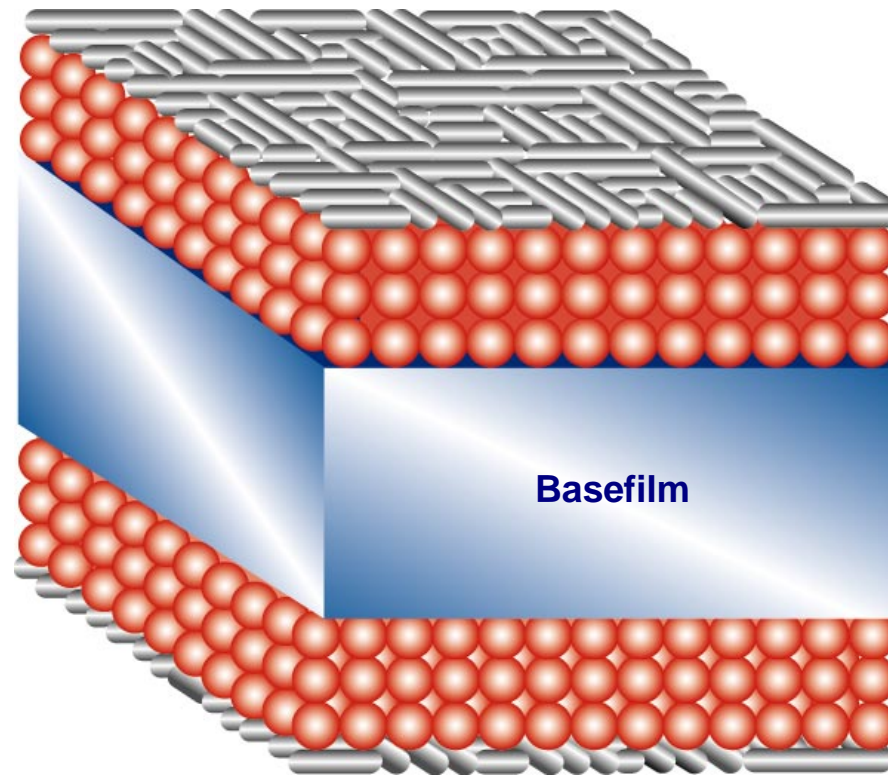
Fujifilm Developed the Simultaneous Dual-Coating Process Technology Using a Die-Coating Method.

Ultrathin magnetic layer with double layer structure



ATOMM DISK TECHNOLOGY

Ultrathin magnetic layer with double layer structure on each recording surface:



All Fujifilm Metal Particle (MP) Media is Designed for Minimum Errors and Maximum Durability:

◆Coating Processes

- Superior Die Coating
- Super-calendering
- Optimized for Each Technology

◆Advance Superfine Metallic Particles

- High Signal Strength (Output)
- Better Data Reliability (Lower Errors)
- Optimized for Each Technology

◆Ultra-Stabilizing Particle Overcoat

- Stable Signal Retention
- Longer Data Retention (Archival Life)

◆3-D Network Binder System

- Resist Time Fatigue (Long Archival Life)
- Exceptional Wear Resistance (Durability)
- Clean Running (No Head Clogging)

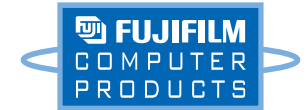
◆Solid & Liquid Lubrication System

- Optimized for Each Technology
- Reduced Tape and Head Wear
- Superior Runnability & Durability

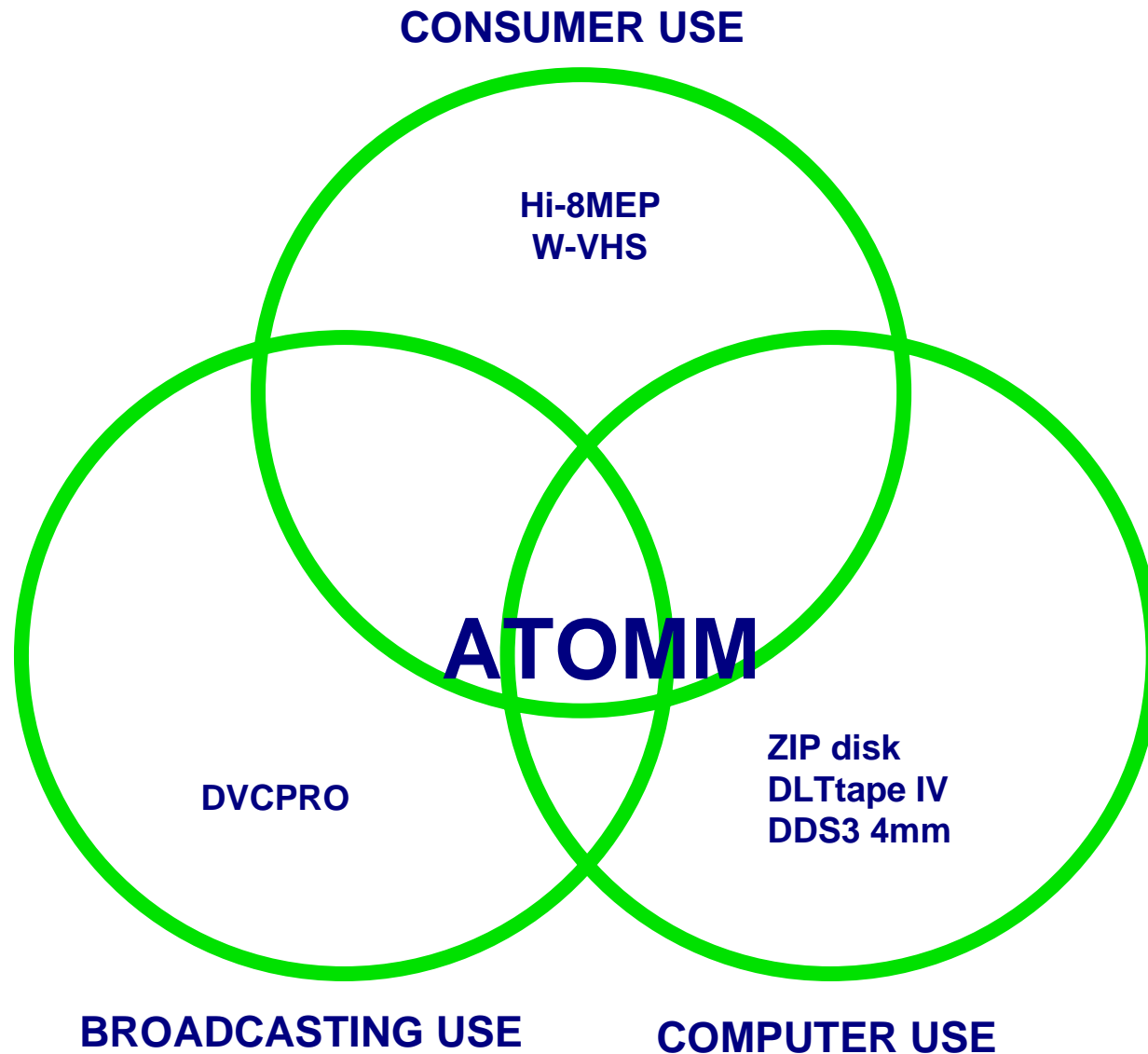
◆ SDR Anti-Static Backcoating

- *Applicable to Tape Media Only!
- Guards Against Dust & Debris Attraction
- Stable/Precise Clean-Running

Application of ATOMM Media



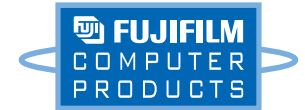
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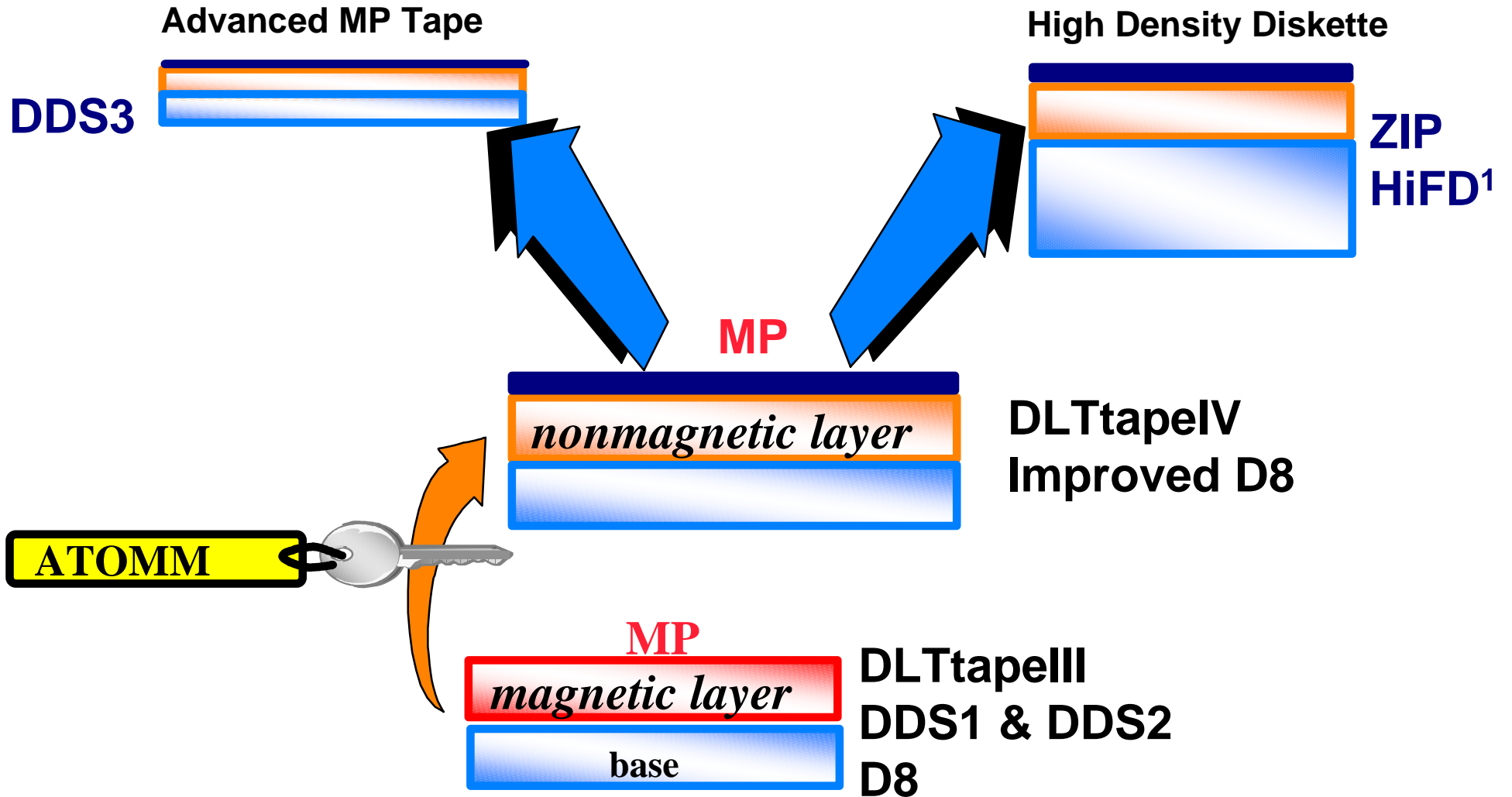
Application of **ATOMM** Technology

- 1992: World's First ME Position Hi-8 MP Video Tape
- 1993: World's First Hi-Definition Video Tape (W-VHS)
- 1994: ATOMM-DISK Technology Announced
- 1995: First ATOMM Computer Tape (DLTtapeIV)
- 1995: First ATOMM Computer Disk (ZIP)
- 1996: First Professional Video Tape (DVCPRO)
- 1996: Fujifilm Data 8mm Tape Renewed by Dual-Coating
- 1996: Fujifilm ATOMM DDS3 (4mm - 125m)
- 1997: Fujifilm & Sony Announce the ATOMM 200MB HiFD Floppy
- 1998: HiFD 200 MB 3.5" Floppies Will Be Shipped

ATOMM Data Storage Applications



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1. HiFD Disks shipping in '98

ATOMM Technology - Tape & Disk

Drive System	Tape media	Native Capacity	Native Performance
DLT™ 7000	DLTtape™IV*	35 GB	5 MB/s
DLT™ 4000	DLTtape™IV*	20 GB	1.5 MB/s
DDS3 4mm	DG3-125M	12 GB	1.0-1.5 MB/s
D8 EXB8505X	QG-160M**	7 GB	0.5 MB/s
D8 EXB8505	QG-112M**	5 GB	0.5 MB/s
Bernoulli™230	5 1/4" Disk***	230 MB	2.7 MB/s
HiFD ****	3.5" Disk	200 MB	3.6 MB/s
Zip™100	3.7" Disk	100 MB	1.4 MB/s

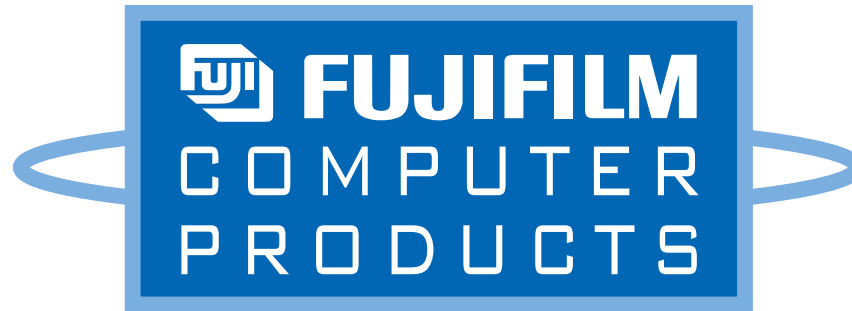
* DLTtape is the new and correct name for tape media formerly know as CompactTape™. DLTtape IV is also know as TK-88.

** ATOMM applied for durability and performance characteristics - not a high density thin-layer application for these two 8mm tape products.

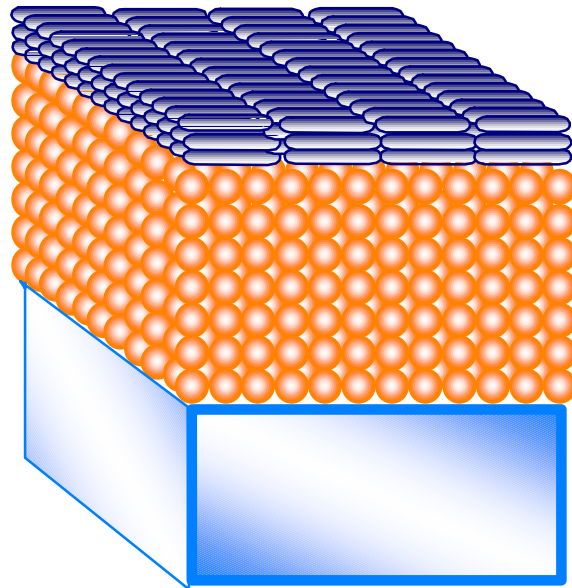
*** An Iomega Corporation product only! No Fujifilm brand Bernoulli 230 MB disk.

**** HiFD Announced in '97, Shipping '98

DLT, DLTtape and CompactTape are trademarks of Quantum Corporation. Bernoulli and Zip are trademarks of Iomega Corporation.



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Advanced super
Thin-layer and high-
Output
Metal
Media