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FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO  
METHOD OF INTENSIFYING ELECTROMAGNETIC RADIATION (ULTRAVIOLET, --ETC(U)  
SEP 78 V A FABRIKANT, M M VUDYNSKIY  
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# FOREIGN TECHNOLOGY DIVISION



METHOD OF INTENSIFYING ELECTROMAGNETIC RADIATION (ULTRAVIOLET, VISIBLE, IR, AND RADIO RANGES OF WAVES)

By

V. A. Fabrikant, M. M. Vudynskiy, F. A. Butayeva



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U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	<i>А а</i>	A, a	Р р	<i>Р р</i>	R, r
Б б	<i>Б б</i>	B, b	С с	<i>С с</i>	S, s
В в	<i>В в</i>	V, v	Т т	<i>Т т</i>	T, t
Г г	<i>Г г</i>	G, g	У у	<i>У у</i>	U, u
Д д	<i>Д д</i>	D, d	Ф ф	<i>Ф ф</i>	F, f
Е е	<i>Е е</i>	Ye, ye; E, e*	Х х	<i>Х х</i>	Kh, kh
Ж ж	<i>Ж ж</i>	Zh, zh	Ц ц	<i>Ц ц</i>	Ts, ts
З э	<i>З э</i>	Z, z	Ч ч	<i>Ч ч</i>	Ch, ch
И и	<i>И и</i>	I, i	Ш ш	<i>Ш ш</i>	Sh, sh
Й й	<i>Й й</i>	Y, y	Щ щ	<i>Щ щ</i>	Shch, shch
К к	<i>К к</i>	K, k	Ъ ъ	<i>Ъ ъ</i>	"
Л л	<i>Л л</i>	L, l	Ы ы	<i>Ы ы</i>	Y, y
М м	<i>М м</i>	M, m	Ь ь	<i>Ь ь</i>	'
Н н	<i>Н н</i>	N, n	Э э	<i>Э э</i>	E, e
О о	<i>О о</i>	O, o	Ю ю	<i>Ю ю</i>	Yu, yu
П п	<i>П п</i>	P, p	Я я	<i>Я я</i>	Ya, ya

\*ye initially, after vowels, and after ъ, ь; e elsewhere.  
When written as ë in Russian, transliterate as yë or ë.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	sinh <sup>-1</sup>
cos	cos	ch	cosh	arc ch	cosh <sup>-1</sup>
tg	tan	th	tanh	arc th	tanh <sup>-1</sup>
ctg	cot	cth	coth	arc cth	coth <sup>-1</sup>
sec	sec	sch	sech	arc sch	sech <sup>-1</sup>
cosec	csc	csch	csch	arc csch	csch <sup>-1</sup>

Russian	English
rot	curl
lg	log

METHOD OF INTENSIFYING ELECTROMAGNETIC RADIATION (ULTRAVIOLET,  
VISIBLE, IR, AND RADIO RANGES OF WAVES)

V. A. Fabrikant, M. M. Vudynskiy, F. A. Butayeva

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A method is proposed for intensifying electromagnetic radiation, based on the use of the phenomenon of induced emission, theoretically developed by A. Einstein in 1917. With the given method of intensification, there does not occur a conversion of energy of the intensified radiation to other forms of energy. The method is suitable for intensifying ultraviolet, visible, and IR radio ranges of waves.

For accomplishment of the described method of intensification we create a medium which has a negative absorption coefficient for radiation. The intensity of the flow of radiation which passed through this medium grows, which causes the intensifying effect. The intensification coefficient equals  $e^{(K)L}$ , where  $K$  - is the absorption coefficient, and  $L$  - the thickness of the layer.

The medium with the negative absorption coefficient is created due to the nonequilibrium distribution of particles of the medium (for example, atoms or molecules) in energy states. The concentration of particles in the upper energy states must exceed (with a calculation of statistical weights) the concentration of particles in the lower energy states. As an example, we proposed the use of a gas medium filling the corresponding container, in which the required nonequilibrium conditions are created, for

example, by the exposure of gas by supplementary radiation, exciting the particles to the corresponding energy states, or by the passage of electrical current through the gas with the simultaneous use of admixtures, selectively destroying the particles located in the lower energy states, or by modulation of current through gas with the use of the phenomenon of recombination of ions and electrons for obtaining particles in the upper energy states.

#### Subject of the invention

A method of intensifying electromagnetic radiation (ultraviolet, visible, IR, and radio ranges of waves), is distinguished by the fact that the intensified radiation passes through a medium in which, with the aid of supplementary radiation or by other means, is created an excessive, in comparison with equilibrium, concentration of atoms, other particles, or their systems in the upper energy levels which correspond to the excited states.

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